The Iron Age

A Review of the Hardware and Metal Trades.

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The "Selden" Plunger Pump.

The great and increasing demand for water works pumps from villages and towns just growing into the necessity for a larger and more certain water supply than can be depended on from the primitive system of wells, and rainfall on roofs, is, we think, a sufficient reason for presenting a somewhat detailed account of one of the leading pumps of this class. The illustration represents a direct, double action plunger pump, as used for mining and city water works, the centers of the steam and water cylinders being placed in one straight line (either vertical or horizontal), thus constituting a direct action pump, in contradistinction to those where the power is transmitted from an engine or other motor to a separate pump. It will be seen that the steam is applied to the steam piston and the power is transmitted "direct" to the water plunger, which is fastened to the opposite end of the piston rod; the power is therefor all expended in doing useful work excepting the very slight friction of the packing.

The engine which we illustrate is very similar to the one used for supplying the town of New Brunswick, N. J., with water. The stroke is 6 feet. The steam cylinder is 36 inches in diameter, and the pump plunger 22 inches. In this engine, on account of the very heavy head of water against which it has to pump (130 feet), the air chamber is made of only 16 inches in diameter and 25 feet high, which gives a very regular flow of water in the pipes. The pump makes from 12 to 20 strokes per minute, the average speed of piston being about 120 feet. With 14¾ strokes per minute the pump delivers 100,000 gallons per hour. The pump is furnished with a Craig & Brevoort condenser, which is worked by a small Selden pump, 10 inch steam and water cylinders with 16 inch stroke. In the engraving, however, the condenser is attached directly to the main pump itself. The small or circulating pump is driven a little faster than the engine itself. The displacement of the plunger per double stroke is 232 gallons; the slip is only 1½ per cent. less than the calculated speed of discharge.

The steam piston has self-adjusting spring ring packing, requiring no attention whatever from the engineer in charge. There are two steam valves, the auxiliary and main valves, both flat faced slide valves, working on a common face. These valves constitute a very marked feature of this pump; their extreme simplicity and certainty of action and the ease with which they can be faced after much use, giving them such a great advantage over the more complicated forms of valve movement. A glance at the illustration shows that no "hand lever" or "starting bar" is used; simply because none is needed with these valves.

The easy, smooth manner in which this pump reverses at the end of each stroke, and the consequent absence of pulsation in the discharge pipe, demands notice, and constitutes one of its especial claims as a water works pump, where the "thumping" action of a badly constructed pump is so mischievous to the mains, especially where the pressure is heavy. This steady and continuous flow in the force mains is produced partly by the proper proportioning of the steam passages, and partly by the arrangement of the water valves.

In this pump the steam and exhaust ports are opened simultaneously at the commencement of the stroke and remain open to the end, when they are similarly opened for the return stroke.

The result of this is, that a steady flow of steam follows the steam piston, giving it a uniform velocity which is communicated to the water in the main. Keeping the above in view, it will be evident to any one acquainted with steam that, as compared with a steam engine having a similar cylinder, this pump will not require so large steam passages even if its piston moves as fast as the average for the engine; when it is added that the piston velocity of the pump is rarely over 100 feet per minute for large sizes the difference will appear more evident, since the engine piston would generally be more than three times the speed. By pushing this comparison farther, so as to include the "lap," "lead" and "cutting off" of an ordinary engine valve, we will find that this pump will be better supplied with steam than the engine if its ports are from ¼ to ⅓ the area allowed for fast running engines.

The great shock delivered to the pump and the water in the mains, by instantly admitting steam and releasing it from the opposite end of the cylinder through large ports, is here totally avoided; in this pump the steam and exhaust passages are reduced to the size found necessary by actual experience to ensure a free admission of steam when the pump is doing its maximum duty, thus avoiding the waste resulting from filling and emptying large ports, and producing the easy admission and emission of steam which makes this pump so remarkably free from thumping in its action.

These pumps are frequently fitted with condenser and circulating pump, the boilers being fed from the hot well, and give excellent results for the coal burned. The action of the steam cylinder and condenser is best shown by indicator diagrams, copies of which, taken from these pumps under different conditions, will be supplied by the builder on application, as their reproduction by explanation here would be too lengthy.

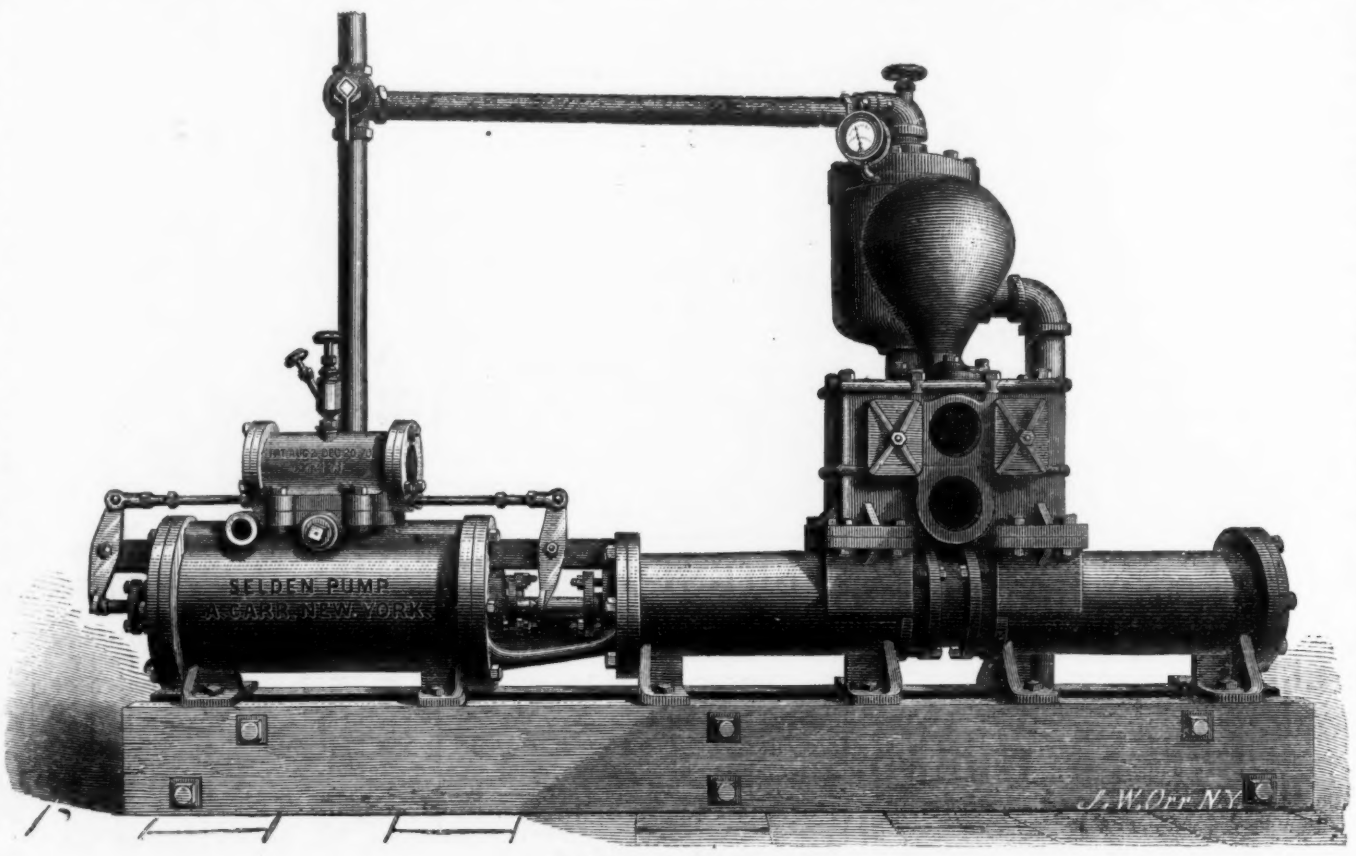
We now come to the water end of the pump, which consists of two water cylinders, having one plunger working into both. For sizes over six inch plunger the suction chamber is under the cylinder, the bed being cast hollow for this purpose; between the cylinders and the top of the bed which forms a common chamber for both, two valve plates are placed on which the suction valves work. Two similar plates (exact duplicates) are placed over the cylinders and covered with a discharge chamber common to both, all the valves being exact duplicates, and consequently interchangeable. These plates are very easily accessible for cleaning or removal.

The action of the water valves remains to be considered, and for the purpose of making this very important feature very distinctly evident we will refer to the action of badly arranged water valves. With any valve where the lift is high (and the usual round valves covering a circular opening must lift half the radius of the opening to give the required area) the "slip" must be great, that is, some of the water which has been drawn through the valves, or forced through the discharge valves, "slips" back again when the pump reverses, before the valves seat, thus actually producing a return current from the main back again into the pump, and from the pump into the suction pipe; under these circumstances, before the valves seat the plunger has reversed and is following the water up with considerable velocity (often greater than the average velocity of the pump), the valves then seat with a heavy thump from the return current on their backs, and the plunger comes instantly against the solid column of water just as a "ram" would against a solid wall; even this comparison being too weak, since water is much harder than any wall.

This common and mischievous evil is avoided in the "Selden" pump by giving the valves a very short lift, the requisite area of discharge being obtained by using a number of long narrow ports with a length of about six times their breadth, thus in the aggregate presenting a very long admission and emission edge. These valves seat easily and quickly, so that the plunger reverses at once against the column of water before it acquires any perceptible velocity, and before the flow of water in the discharge main has noticeably stopped, producing, as referred to before, the smooth steady action for which this pump is so celebrated.

The valves are flat rectangular pieces either of brass or faced with rubber or leather, and can be taken out from the small pumps in a few seconds, and from the large water works pumps in from one to two minutes. In emergencies flat pieces of wood can be used till duplicate valves are procured.

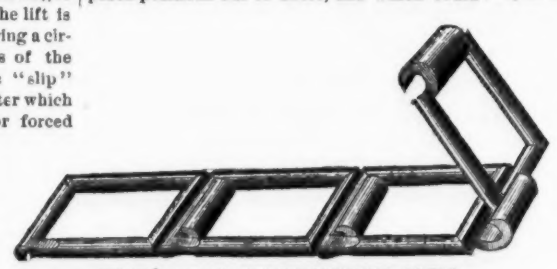
This pump was patented in the United States in 1870, since which time some very expensive and important experiments have been made, resulting in several valuable improvements. In its present form it is strong, simple, fairly economical of power, and efficient in its working. It has been successfully introduced into the mines in Saxony, is patented in England and represented and largely manufactured by one of the leading firms there (J. H. Wilson & Co., Liverpool). More detailed information on particular points may be obtained from the proprietor and builder, Mr. A. Carr, 43 Cortlandt street, N. Y.



THE "SELDEN" PLUNGER PUMP.

Transmission of Power by Chain.

Among the recent inventions which have come prominently into notice, is a chain with detachable links, adapted primarily to the transmission of power. The invention grew out of an attempt to supply a transmitting agent for elevators and carriers in harvesting machines. In order that these machines might be adapted to work in grain in all conditions, and at all elevations, it became necessary to give a transmitting device which would work well in exposed positions out of doors, and which could at the same time be lengthened and shortened at will, and without the use of tools.



EWART'S CHAIN FOR TRANSMITTING POWER.

To accomplish this, a chain was made of malleable cast iron, formed of a succession of open links, each cast with a round at one end, and a connection at the other; the latter being cast in shape, with a permanent opening for the purpose of detaching, while at the opposite end, one side of the link adjoining the round was notched for the purpose of allowing a side attachment and detachment with the succeeding link as shown in the cut.

The result thus secured is a flat chain, the links of which have a wide support, the consequence being that they are subjected to slight wear, and are almost noiseless in service. The value of this invention will be at once apparent to practical men, but we venture to give below a somewhat hasty suggestion of some of the advantages secured by it.

The links are all detachable, instantly, and without the use of tools, involving the great desideratum of lengthening and shortening at pleasure. The power, transmitted over sprocketed wheels, is as certain as gearing. The connections on the links are cast in permanent form, thus effectually disposing of the question of stretch in service. The broad bearing secured by the round of the link working in the connection of its fellow for the full width of the opening, gives a chain which may be run on edge without sagging. It will be seen that the form of the links and their close succession gives a chain with edges straight and smooth as a belt. It will also be seen that the round working in round sockets the minimum of friction, thereby giving great wearing quality. While exposed, transmissions may be made with this better than with any other known device; short and slow transmissions can be made where belting and wire rope both fail. Its availability for vertical transmissions is especially noticeable. For carrying and elevating purposes attachments may be cast to the links for connecting slats, rakes, buckets and other devices employed for those purposes. A glance at the link will show that by varying its form and size a chain of almost any strength may be obtained.

We commend this to the attention of all mechanics as a most valuable aid, and interested persons may communicate with the inventor, Mr. W. D. Ewart, in care of the Chicago Malleable Iron Company, 116 Lake street, Chicago.

Japanese Fancy Work.—The fine arts of Japan are abandoning their thrones. The art of China is well nigh dead; true, they still paint porcelain and carve ivory with dim recollections of bygone splendors, but the old and good art is gone, and can never come again. The art of Japan is deteriorating, and it would seem that the decorative arts of an Eastern people cannot bear the evil effect of the European market; Chinese art has died of the demand for dinner sets, backgammon boards, work boxes and chessmen for exportation; and Japanese art is fast becoming moribund now that a sale can be found for hundreds of thousands of fans a year, with glove boxes and teapots in proportion. The workmen who have the exceptional skill required for the finest work, to whom have descended those secrets of workmanship and that familiarity with design which we find so extraordinary, will not continue to do fine work when cheap articles of sale have begun to pay well. When Shanghai was opened for trade, delicate inlaid work was to be bought there; one large round table we know of which was bought for 18 silver dollars; similar work bought there now, at four times the price, is very inferior in design and workmanship. So a bronze vessel of exquisite finish, which cost 40 silver dollars in Nagasaki a few years ago, a French bronze worker would not attempt to reproduce for less than 600 francs. The native workmen hear of European prices, and there is every probability that the Japanese founders and engravers who did this wonderful piece of work are now engaged in making the common silver inlaid bronze vases and candlesticks, of poor workmanship and no particular design, for the European market.

A Blast Produced by Superheated Steam.

For a long time past a French engineer, named Testud de Beauregard, has busied himself with finding new uses for superheated steam. Recently he has constructed a steam blast which is thus described in the *Deutsche Industrie Zeitung*. His apparatus, which may be used to force air into a smith's forge, for example, consists essentially in this, that a superheater is attached to any sort of a steam generator, and has a discharge pipe to which are fixed five little mouth pieces 1 millimeter wide. The steam which escapes from these enters conical tuyeres which are provided with cylindrical end pieces, and all the steam jets are collected in one tube. The escape mouth pieces are each provided with a separate stop cock, so that one or more may be cut off when it is not desired to drive so many fires. The steam heated to 700°C. (1292° Fah.) escapes from each of these mouth pieces with an expansive force of 4 to 5 atmospheres, which corresponds to the great quantity of heat contained in it, and this forms to a certain extent a propelling piston in the cylindrical tube through which it passes, so that the air sucked along with it into the conical tuyeres is forced violently along, and compressed when it reaches the collecting tube. This latter is a worm-shaped tube which opens in a vessel of water. Here the small amount of water in the steam condenses and settles, while the compressed air collects in the upper part of the vessel, whence it can be conducted wherever needed.

With this arrangement Testud de Beauregard believes that a much more perfect application of power can be obtained than with valves or ventilator, because the steam acts by its pressure as well as by its heat and its large volume, which latter, according to Testud's experience, is about 4½ times as great for superheated steam as for saturated steam. Such superheated steam, in consequence of its heat and lightness, will carry with it eleven times its volume, and it is supposed that if 820 liters of blast can be produced by the evaporation of 1 kilo. of water in the ordinary blast apparatus, the same quantity of steam by Testud's apparatus will generate 14,000 liters of blast. This current of air is easily regulated according to the quantity desired by opening and closing the stop-cocks, and beside it possesses a constant temperature, which can be regulated at will, as well as a constant hygrometric quality. It is also suggested that this blast will be deoxidizing, as opposed to the dry oxidizing action of a ventilator, which would be an advantage for many purposes. If, on the other hand, an oxidizing blast is desired, the steam still contained in the blast can be easily condensed and removed, by cooling the conducting pipes.

The Survey of Lake Ontario.

The following are some of the particulars in regard to the United States survey of Lake Ontario:

The survey party in charge of the work consists of five distinct corps, each numbering about twenty men. Each party takes a section of ten miles—making a survey of coast line of fifty miles at one time. They have just completed the survey of the whole shore of Lake Ontario, the topography of the shore and soundings being clearly marked. The party at the mouth of the Niagara River are just finishing the survey of the river, from Lewiston to Navy Island. The soundings at these points have not been so satisfactory as at other points of the river. At the new Suspension Bridge good results were obtained, the lead under the bridge showing a depth of 192 feet, while a little below the depth varied from 162 to 165 feet. The hight of the American Falls is 158 feet—an accurate measurement, as by the assistance of a guide the lead was placed at the base of the Falls near the "Shadow of the Rock." It will be observed that the above measurement of the American Falls is the same as former surveys give as the depth of the Horse Shoe or Canadian Falls, viz., 158 feet, while the previous measurements of the American Falls is stated at 164 feet in perpendicular hight. The line of the American Falls, usually stated as 200 feet in length, is so ragged that it is difficult to obtain any exact measurement. The survey party intend to overcome this difficulty by the use of mirrors, by throwing a light from one side to any desired point on the other shore. It is believed that the disputed question whether the line of the falls is extending up the river will be settled, though doubts are entertained whether the survey of 1842 can be relied upon as a correct basis of calculation. The result will be watched with interest, as will also the survey of the Horse Shoe Falls.

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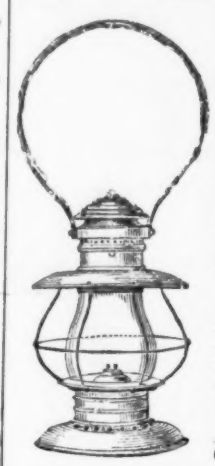

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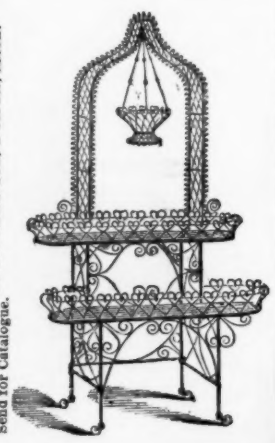

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WOODEN WARE MANUFACTURE.

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The introduction of late years of wooden ware as a staple among the assortments of house furnishing and hardware dealers has given to this branch of industry an impetus so great that at the present time, in various parts of the country, large factories, fitted with every modern contrivance in machinery known to workers in wood, are found necessary to supply the constantly increasing demand. A brief description of an establishment of this kind, possessing natural advantages to an unusual degree, will be of interest.

In 1869, F. F. Adams & Co., of Erie, Pa., commenced the manufacture of wooden articles in a small factory in that city, but their business steadily increasing, it was found necessary in the early part of 1873 to obtain larger facilities to meet the demand for their specialties, and in consequence their present large factory was erected. Their buildings have a frontage on Cherry street of 135 feet, and on the Lake Shore R. R. 100 feet, from which road a side track enables them to receive stock and ship goods without the expense of cartage. Power is derived from a 50 horse engine and boiler, the fuel for which is obtained from a gas well on the premises, and the gas light for the shops is obtained from the same source. The machinery, a large portion of which was invented and designed to meet their special requirements, is of the most approved construction, all the parts being interchangeable and easily replaced in case of accident. A large portion of the lumber used is cut directly from the log, in a saw mill erected on the premises and specially adapted to cutting such stock as is required for the various articles manufactured. They are provided with a large steam kiln, constructed on the Chicago plan, with which 50,000 feet of lumber per week can be thoroughly seasoned; the exhaust steam is used for heating the factory during the cold season, no fire being used upon the premises, except under the boiler. Their principal specialties are washing machines, wringers, extension ladders, step ladders, clothes horses, towel rollers and kindred articles, to which they have lately added hardwood wainscoting. The manufacture of washing machines was commenced by them about five years ago, since which time the "Complete Washer" has become almost as well known as some of the most popular sewing machines, more than 100,000 of them being made and sold during that time. These goods have been sold entirely through canvassing agents, in the same manner as sewing machines; all other goods are sold through the trade. Among their specialties deserving of particular mention is the Lovell lock hinge step ladder, which combines lightness with strength, and is automatic in its operation; these goods are well and favorably known, and are placed on the market at such a low price that their sale has steadily increased each year since their first introduction.

In regard to the new specialty, "hardwood wainscoting," this article has heretofore been made and sold almost exclusively by planing mills to builders' order; the consumer had to cut it to the proper lengths, and smooth by hand (we speak of matched and beaded, not paneled work) losing stock and consuming much time. F. F. Adams & Co. cut it directly from the log in such a way as will show the grain of the wood to the best advantage. After sawing it is thoroughly kiln dried, neatly matched, bead d, smoothed and cut to the proper lengths, when it is packed in bundles of 50 feet each, ready for market. In this way they claim to make a superior article, which saves the purchaser waste and requires only the hand labor necessary to put it up, while the cost is less than formerly.

This business, only a few years in existence, is now fully established. During the trying period of our late financial panic it ran along smoothly, employing its full complement of workmen, and on full time. Beside the specialties named above they have facilities for making straight and irregular turned work of various kinds. Their trade extends to all parts of the United States and Canada, with a growing export demand for European and South American markets.

In their advertisement on another page they illustrate "Lovell's automatic lock hinge step ladders" of which they say "they are the best and cheapest in the world," and to which we invite our readers' attention.

Chain Cable Testing.

Experiments of much importance to the producers and consumers of chain cables and anchors have lately been made in England. Chain makers in the Midland and other districts have for some considerable time felt dissatisfaction at the method employed in testing their chains, and recently a deputation waited upon a committee of Lloyd's and the Board of Trade, to see if the existing regulations could not be modified. The matter having been considered, it was agreed that the chairman of the committee and a number of other gentlemen should visit the chain works in the district, and the testing house of the company, for the purpose of seeing what could be done. On August 7th, Mr. Chapman, chairman of the committee, and several of the directors visited the works of Messrs. Wright & Co., of Tipton, and were there met by a number of local chainmasters. The party having inspected some new machinery for binding the links of special best best cables, and the manufacture of Martin's patent self casting anchors, they visited the proof house at Bloomfield, belonging to Messrs. Lloyds. A best best cable, the manufacture of Messrs. Parks & Ross, was tested, but presented no fracture after being submitted to the full breaking strain required by the Act of Parliament. Upon a more severe test being applied a slight flaw occurred, which was considered to be sufficient to cause its rejection. Another test was applied, viz., a strain of 80 per cent. above Admiralty proof, and the consequence was the chain was broken asunder. The same afternoon a private meeting of the committee from Lloyd's, and a number of chain masters, was held at Dudley, when we learn that the discussion as to the grievances of the trade was both long and animated. One or two important matters could not be settled, though several minor questions were determined upon an amicable basis. One question that was not settled was whether the public should be present at the testing of chains or cables; and another was what was to be understood by "breaking strain." It was held by the chairman that the words "breaking strain" meant "proving to destruction," whilst Lloyd's representatives contended it meant the slightest crack perceptible by and of a magnifying glass. Ultimately it was decided to consider the questions on a future occasion, the date to be fixed in London.

Cast Iron Pavements.

Cast iron street pavements have been introduced into Warsaw (Poland), and the German journals give very favorable accounts of them. The length of the blocks in the direction of the street length is 2 ft.; the length crosswise of the street, 3 ft. 6 in.; the thickness, 3 in.; and weight, about 220 lbs. The width of the cast iron pavements in the streets of Warsaw is 17 ft. 6 in.; hence, five rows of these blocks are required. Before laying the pavement, an even bed of small stone 7 in. thick is prepared, sprinkled and stamped fast, so it is now but 6 in. thick, or less. The surface is made smooth by a thin layer of sand or gravel, the cast blocks laid on side by side, the cracks filled with gravel and made firm by wetting and stamping. A row of paving stones may form the border to the iron pavement. It is kept in order by occasionally putting in some gravel wherever hollows are formed.

The chief advantages of this pavement, as given in the *Deutsch Ind. Zeitung*, are: 1. It is quickly laid. 2. It is pleasant to ride upon. 3. It does not get smooth, either in summer or winter. 4. The profile is not altered, even by the transportation of heavy loads. 5. It is easily thawed out in frosty weather. 6. Small cost of keeping it in repairs. The total first cost of it is about 30 marks per square meter (about 67 cents, gold, per square foot). The blocks used there were cast by F. Haas in Lennep.

[We should feel doubtful of points 3, 4 and 5, while the first cost here would also be an objection.—Ed.]

A California Tree for the Centennial.—Some time ago we mentioned the fact that Mr. Vivian was preparing a large piece of one of the Tulare county big trees to exhibit at the Centennial next year. The piece of timber selected will be 16 feet long, and 21 feet in diameter at one end, and 19 feet at the other. The heart of this will be taked out, leaving only about one foot of the body of the tree attached to the shell or bark. This outside shell will then be divided into eight equal parts, each of which will weigh 4000 pounds without the bark. It is necessary to divide it into this number of parts in order to allow it to pass through the numerous tunnels between here and Philadelphia. The eight parts will weigh about 30,000 pounds, and will require two cars for their transportation. One solid foot of this tree weighs 72 pounds, being 10 pounds heavier than so much water. This timber was taken out of the Gen. Lee, a tree 275 feet high, and which, had it been sawn into lumber, would have produced a sufficient quantity to have built a very respectable young town or a large ship. It contained more than 200,000 feet of lumber, beside, probably, about 200 cords of wood. The Gen. Grant, a much larger tree than the Gen. Lee, and the largest in the world, growing in the same grove, is left standing, probably for the benefit of the future.—*Visalia (Cal.) Delta.*

An Engine of Destruction.—A terribly destructive shell is one of the inventions described at great length in the foreign scientific journals. In brief, it is a hollow cast iron cylinder, having a small receptacle turned in its base for half a grain of rifle fine-grain powder as a bursting charge, contained in a shallow bag. A thin disk of iron screws into the cylinder and covers the bursting charge, having an aperture in the center, through which trains of quick-match are laid, forming instantaneous communication between the charge chamber and the flame from the fuse, upon the ignition of the composition in the latter. The half of the shell nearest the base is considerably stouter in its substance than the upper half, and just admits of six magnesium starlights being placed upright within it, upon the disk covering the powder chamber, so as to leave a small space in the center of the circle formed by them, exactly over the hole in the disk. The lights are composed of nitrate of baryta, chlorate of potash, magnesium powder, and boiled oil, and are contained in paper cylinders having a small quantity of damp powder at either end; to insure ignition they are surrounded with bands of quick-match. They are calculated to burn for 14 seconds. The upper half of the shell has seven signal starlights within it, placed upright upon those below; their ingredients are nitre, sulphur, orpiment and magnesium powder slightly coated with paraffine.

Machinery Lubricants.—A patent has been taken out in France for lubricants compounded as follows: (1) Graphite, 35 parts; talc, 25; sulphur, 20; wax or paraffin, 20; (2) graphite, 30 parts; bone glue, 15; water, 32; sulphur, 12; wax or paraffin, 11.

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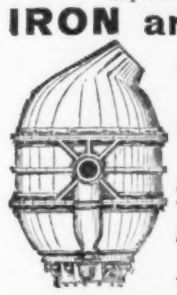
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New Patents.

We take from the records of the Patent Office in Washington the following specifications of certain patents lately issued, which will be found interesting:

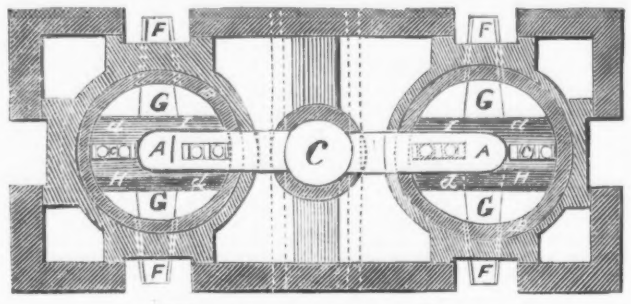
IMPROVEMENTS IN CALCINING KILNS.

Specification forming part of Letters Patent No. 166,159, dated July 27, 1875, issued to Wm. J. Taylor, of High Bridge, N. J.

This improved kiln for roasting ores is more especially adapted for treating magnetic oxides of iron ($FeOFe_2O_3$) for the purpose of oxidizing whatever sulphur they may contain into sulphurous acid gas (SO_2) and also oxidizing the protoxide (FeO) into sesquioxide (Fe_2O_3) as far as possible.

In the accompanying drawings, Figure 1 represents a horizontal section of a double kiln embracing this invention, the air-downtakes and the combustion chambers being shown in plan, and Fig. 2 a vertical cross section of one of the kilns.

In the construction of this kiln, for convenience and economy, they are built in pairs, inclosed in rough stone masonry, and preferably of rectangular form, well bound together with either wooden or iron binders. This double form is of special advantage by reason of its cheapness of construction, and in connection therewith the air-downtake A for each kiln B is supplied from an intermediate flue or uptake, C, within and forming part of the wall



IMPROVED CALCINING KILNS.—*Fig.* 1.

which divides the two kilns, and by which the air is supplied to both kilns alike and at the same temperature, as the walls forming such air-uptake or supply flue C are contiguous to the walls of the kilns and are thereby heated by the radiation from the double kilns. The kiln, however, may be built in single form. In such case, the air-uptake or supply-flue C may be built in one of the side walls, or arranged outside thereof, as may be deemed best. The chamber or chambers B, for holding the ores to be desulphurized, are built of fire brick or any suitable material, with double walls, so as to leave intervening spaces, which are packed with loam or any other suitable material. The kilns are provided with charging openings D at the top. At the base of the ore chamber is constructed the fire or combustion chamber E, with the necessary doors, grates and fixtures. Proper chutes, F, connect, by inclined bottoms G, with the outside walls of the combustion chamber, through which to draw off the roasted ore. The combustion chamber E, is located centrally in the kiln, and its crown or arch H forms the dividing ridge between the opposite chutes F, which are provided with suitable closing or stop doors. The combustion chamber E is provided with a series of openings, *a*, on each side, just above the inclines G, for the chutes, through which the flame and gases escape into the ore chamber.

In addition to these, similar openings *b* are made in the crown or arch, H, of said chamber, to allow the flame and gases to escape therefrom at this point, whereby a more uniform spread of the heat from the combustion chamber throughout the base of the ore chamber is obtained. These upper openings *b* are guarded by arched shields *c*, and the side openings *a*, are protected by ledges or projecting eaves *d*, which form continuations of the crown arch H, and thereby prevent the ore from running into the combustion chamber at all these flame openings. Combined with this centrally arranged fire and combustion chamber E is a centrally arranged air-downtake or supply pipe, A, in such a manner that the outlet *e* thereof is in near contiguity with the top surface of the crown or arch H of such fire chamber, leaving only sufficient space between the two for the free outlet of the air which flows down said pipe. This pipe A, to perform its functions properly, and to conform to the dimensions of the kiln, should be about one-third of a square inch to about one cubic foot of the cubical contents of the kiln. This downtake A occupies the center of the kiln, and is maintained in such position by any suitable means. Its upper end is not open to the air, but is joined to a lateral branch, I, which, extending through the wall of the kiln, forms a junction with an uptake, C, which extends down to the base of the kiln and must open into the outer air at a much lower level than the downtake, in order thereby that the air current will be maintained within, and through, said conduit and into the kiln when it rises through the ore. As stated, this uptake C can be either within the wall of a single kiln or outside thereof, and in a double kiln its position is between the kilns, and forms a part of the walls which seperates them. In the combination of this element with a double kiln the uptake C should be of double the area of the downtakes A. In practice the junction of the uptake C with the downtake A should be at a point about one-third the distance from the top of the kiln; but this is immaterial and may be varied.

The down take or takes A being surrounded by the heated ore are thereby heated, and the air is, of course, also heated before it enters the ore chambers, and, in this respect, takes no heat directly from the combustion chamber.

The hot air is delivered directly upon the crown or arch H of the combustion chamber, and is thereby deflected or turned aside from the central issue into the ore, and, meeting the flame and gases rising from the openings into the combustion chamber, unites therewith, and rises through the mass of ore. The central location of this downtake A also prevents the heat taking an accumulating course in the center of the kiln, and thereby renders the heat more uniform, and places it under absolute control.

The quantity of inflowing air is regulated by dampers placed in the lateral branch or branches I connecting the downtake or takes, and these are governed by damper rods extending through the kiln wall or walls. The flow of air to support combustion in the fire chamber is admitted through a suitable register in the door of the ash pit.

A series of sight holes, *f*, two or three inches in diameter, are inserted through the walls, in order that the state of the heat of the ore in the kiln may be ascertained at any time, and the combustion in the fire chamber regulated accordingly.

If desirable to obtain the greatest economy and rapidity of working, enough fuel may be mixed with the ore when it is charged into the kiln to heat it to the proper temperature, and use the heat of the combustion chamber only to maintain that temperature during the balance of the time occupied in oxidation. The ore should be broken into quite small pieces, and the very fine ore separated from it; otherwise it would take too long for oxidation to penetrate each piece, and the fine ore, if used, might clog the kiln. It will also be found desirable to draw the ore from the kiln as hot as possible, and cool it with a stream of water.

The rapid cooling of the surface of each piece has a tendency to burst the ore and make it still more porous. At the same time the water will assist to further oxidize the ore, and also to remove any sulphur that may remain by forming sulphureted hydrogen.

This kiln is adapted for the roasting of all ores, whether they be sulphurets, carbonates, or hydrates; for, although an oxidizing atmosphere is not necessary for the latter, yet the carbonic acid (CO^2) and water (H^2O) can be more readily and cheaply expelled by this kiln than any other known to me.

Claim.—1. The combination with an ore roasting kiln, of an air downtake, A, depending centrally within the kiln chamber, whereby the

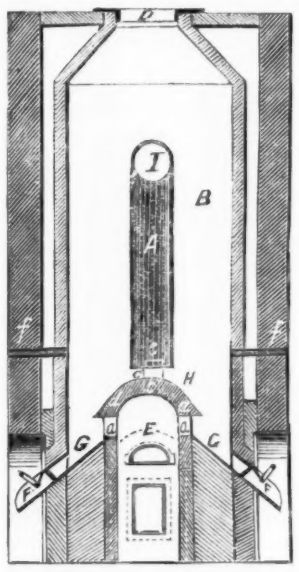


Fig. 2.

heated air will be diffused and discharged therefrom at a point above the combustion chamber.

2. The combination, in an ore roasting kiln, of a centrally located air downtake, A, with a centrally located fire and combustion chamber, E, beneath said downtake and separated from it, whereby the air is delivered at a point centrally upon the crown or arch of the combustion chamber, and diffused or turned aside uniformly into the ore chamber.

3. The combination, in an ore roasting kiln, of a centrally located downtake, A, with a centrally located fire and combustion chamber, E, provided with lateral and top flame and gas openings *a b*, whereby the upward issuing flames of combustion are brought into immediate contact with the inflowing currents of heated air from the downtake, to more equally distribute both the heat and the air.

4. The air downtake A, depending centrally from near the top of the kiln, and combined with the uptake C, joining the upper end of the downtake by the branch I, and extending down outside of the kiln, whereby the cold air entering at the top is caused to descend through the entire length of the central hot pipe.

5. The combination of two kilns B B for roasting ores with an air downtake, A, centrally located in each, supplied by a single uptake, C, built in the dividing wall of said kilns.

6. The combination, in a twin kiln for roasting ores, having centrally located air downtakes depending in each from or near the top, of the intermediate uptake C, having greater length and double the area of the combined downtakes.

7. The combination, in a twin kiln for roasting ores, of the centrally located fire and combustion chambers E in each, the centrally located air-downtake A therein, and the intermediate air-uptake C, having the relation to each other and co-operating to produce the results herein stated.

IMPROVEMENT IN CONVERTING OLD IRON INTO STEEL.

Specification forming part of Letters Patent No. 163,080, dated May 11, 1875, issued to Alexandre Jullien, of Paris, France.

This invention relates to certain improvements in the manufacture of steel from cast iron and wrought iron, combined with a percentage of ferro-manganese, the object being to utilize the old and comparatively worthless wrought iron in the market for the manufacture of steel.

It consists of a compound formed by melting in a Siemens-Martin or other suitable furnace, 1000 parts of cast iron, selecting that which contains less than one-thousandth part of phosphorus, and adding from time to time suitable quantities of wrought iron in the shape of old nails, axles, and the like, the whole quantity varying from 2500 to 3500 parts, according to the amount of carbon present in the cast iron. After the mass has all been reduced to a molten state, 65 parts, or thereabout, of ferro-manganese, containing about 60 per cent. of manganese, are added in fragments from time to time to the mass, and melted therewith. The materials must be quickly mixed during this process until the whole are thoroughly melted and combined, after which the compound may be run off into molds and formed into ingots.

In carrying out the invention, the following proportions have been found to answer well, although they may be considerably varied, according to the percentage of carbon in the cast iron. White cast iron, 1000 kilogramms; old wrought iron, such as old English rails, for instance, 2600 kilogramms; ferro-manganese, containing 55 per cent. of manganese, 65 kilogramms.

These materials are melted, as above described, and when completely combined are run into molds, and the alloy allowed to cool for use.

Claim.—The compound or alloy, consisting of wrought iron, cast iron and ferro-manganese, combined in or about the proportions herein set forth.

Iron Making in the Central Presidency, India.

Mr. Walter Ness, who, it will be remembered, went out some time ago on behalf of the British government to superintend the development of the Worrora coal field in India, has sent a communication, dated Worrora Colliery, Central Presidency, June 29th, to the South Staffordshire Mill and Forge Managers' Association. He says he has now in hand the question as to whether the coal, and ironstone and iron ores of India can be profitably utilized. Ere this he expected to be ready to have made his tests on a practical scale, but he says: "I have such awkward hands to deal with that I am six or eight weeks short of that." When, however, he has got into what he terms real iron, he promises to send the association a copy of his notes. Mr. Ness, who is not only a mining engineer, but also a metallurgical chemist, has had enough experience in the making of iron commercially to depend too much upon any results he may obtain in his laboratory; but he is not without encouragement that his commercial tests may be all that he would desire, seeing that his scientific experiments have been cheering. Mr. Ness has made many tests on a laboratory scale, and these convince him that it is only a matter of adjustment in parts to get a result that will be a commercial success. The readers of *The Engineer* will not be surprised to hear that Mr. Ness does not expect to be able to do without the aid of machinery in the puddling of iron in India. Upon this subject he says: "I need not tell you that with weak native labor, and a climate such as this, hand puddling will not suit, neither do I think it will be necessary; but I cannot say more just now." Mr. Ness is not the man to be daunted by trifles, and we think that if it is possible for iron to be made from native ores and with native fuel, in such a climate, and with the aid of the labor which the district provides, Mr. Ness will accomplish it. The government of Great Britain may look forward to considerable saving in those items of their expenditure which now relate to coal and iron required in certain portions of our Indian Empire. The time of such economy has not, however, yet arrived; and British iron masters have not, therefore, much cause to fear any conspicuous falling off at an early day of their trade with British India.—*The Engineer.*

An Assayer's Paradise.—The *Mining Review*, of Georgetown, Colorado, has the following: Boulder county is the assayer's paradise. Not only can the diligent chemist find ores in plenty upon which to test his skill, but we doubt if there is a piece of rock in the entire county that would not consider itself a disgrace to its paternity if it did not go at least 1000 ounces, while the vast majority of bedrock and pebbles from the plains to the range, are capable of soaring up to five or ten thousand, without boasting in the least of the feat. And even if an unfortunate piece of granite finds itself lying around loose without a chunk of native silver or virgin gold, or a seam of ruby or glance attached, it never is happy until it has squared things by forming a close acquaintance with a piece of tellurium or bismuth, or some other wonderful and rare element. We reflect, with envy, how frequently the native assayer, there, must be forced to gather up his big assay buttons, melt them into a gold and silver brick, express them to Denver in his valise, and then follow to spend a few jolly days therewith in the metropolis.

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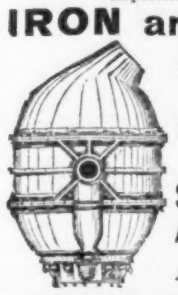
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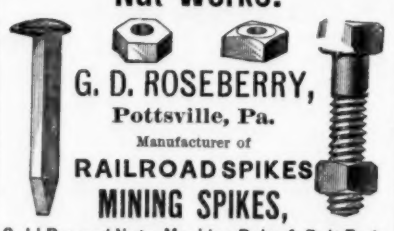
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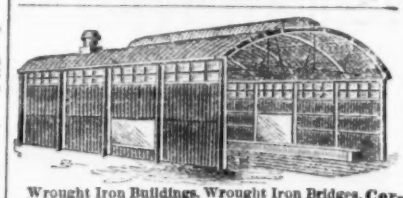
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New Patents.

We take from the records of the Patent Office in Washington the following specifications of certain patents lately issued, which will be found interesting:

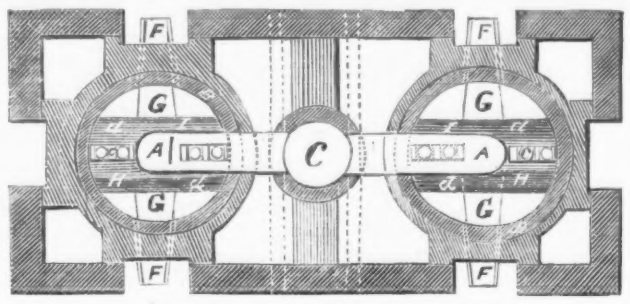
IMPROVEMENTS IN CALCINING KILNS.

Specification forming part of Letters Patent No. 166,159, dated July 27, 1875, issued to Wm. J. Taylor, of High Bridge, N. J.

This improved kiln for roasting ores is more especially adapted for treating magnetic oxides of iron ($FeOFe_2O_3$) for the purpose of oxidizing whatever sulphur they may contain into sulphurous acid gas (SO_2) and also oxidizing the protoxide (FeO) into sesquioxide (Fe_2O_3) as far as possible.

In the accompanying drawings, Figure 1 represents a horizontal section of a double kiln embracing this invention, the air-downtakes and the combustion chambers being shown in plan, and Fig. 2 a vertical cross section of one of the kilns.

In the construction of this kiln, for convenience and economy, they are built in pairs, inclosed in rough stone masonry, and preferably of rectangular form, well bound together with either wooden or iron binders. This double form is of special advantage by reason of its cheapness of construction, and in connection therewith the air-downtake A for each kiln B is supplied from an intermediate flue or uptake, C, within and forming part of the wall



IMPROVED CALCINING KILNS.—*Fig. 1.*

which divides the two kilns, and by which the air is supplied to both kilns alike and at the same temperature, as the walls forming such air-uptake or supply flue C are contiguous to the walls of the kilns and are thereby heated by the radiation from the double kilns. The kiln, however, may be built in single form. In such case, the air-uptake or supply-flue C may be built in one of the side walls, or arranged outside thereof, as may be deemed best. The chamber or chambers B, for holding the ores to be desulphurized, are built of fire brick or any suitable material, with double walls, so as to leave intervening spaces, which are packed with loam or any other suitable material. The kilns are provided with charging openings D at the top. At the base of the ore chamber is constructed the fire or combustion chamber E, with the necessary doors, grates and fixtures. Proper chutes, F, connect, by inclined bottoms G, with the outside walls of the combustion chamber, through which to draw off the roasted ore. The combustion chamber E, is located centrally in the kiln, and its crown or arch H forms the dividing ridge between the opposite chutes F, which are provided with suitable closing or stop doors. The combustion chamber E is provided with a series of openings, *a*, on each side, just above the inclines G, for the chutes, through which the flame and gases escape into the ore chamber.

In addition to these, similar openings *b* are made in the crown or arch, H, of said chamber, to allow the flame and gases to escape therefrom at this point, whereby a more uniform spread of the heat from the combustion chamber throughout the base of the ore chamber is obtained. These upper openings *b* are guarded by arched shields *c*, and the side openings *a*, are protected by ledges or projecting eaves *d*, which form continuations of the crown arch H, and thereby prevent the ore from running into the combustion chamber at all these flame openings. Combined with this centrally arranged fire and combustion chamber E is a centrally arranged air-downtake or supply pipe, A, in such a manner that the outlet *e* thereof is in near contiguity with the top surface of the crown or arch H of such fire chamber, leaving only sufficient space between the two for the free outlet of the air which flows down said pipe. This pipe A, to perform its functions properly, and to conform to the dimensions of the kiln, should be about one-third of a square inch to about one cubic foot of the cubical contents of the kiln. This downtake A occupies the center of the kiln, and is maintained in such position by any suitable means. Its upper end is not open to the air, but is joined to a lateral branch, I, which, extending through the wall of the kiln, forms a junction with an uptake, C, which extends down to the base of the kiln and must open into the outer air at a much lower level than the downtake, in order thereby that the air current will be maintained within, and through, said conduit and into the kiln when it rises through the ore. As stated, this uptake C can be either within the wall of a single kiln or outside thereof, and in a double kiln its position is between the kilns, and forms a part of the walls which seperates them. In the combination of this element with a double kiln the uptake C should be of double the area of the downtakes A. In practice the junction of the uptake C with the downtake A should be at a point about one-third the distance from the top of the kiln; but this is immaterial and may be varied.

The down take or takes A being surrounded by the heated ore are thereby heated, and the air is, of course, also heated before it enters the ore chambers, and, in this respect, takes no heat directly from the combustion chamber.

The hot air is delivered directly upon the crown or arch H of the combustion chamber, and is thereby deflected or turned aside from the central issue into the ore, and, meeting the flame and gases rising from the openings into the combustion chamber, unites therewith, and rises through the mass of ore. The central location of this downtake A also prevents the heat taking an accumulating course in the center of the kiln, and thereby renders the heat more uniform, and places it under absolute control.

The quantity of inflowing air is regulated by dampers placed in the lateral branch or branches I connecting the downtake or takes, and these are governed by damper rods extending through the kiln wall or walls. The flow of air to support combustion in the fire chamber is admitted through a suitable register in the door of the ash pit.

A series of sight holes, *f*, two or three inches in diameter, are inserted through the walls, in order that the state of the heat of the ore in the kiln may be ascertained at any time, and the combustion in the fire chamber regulated accordingly.

If desirable to obtain the greatest economy and rapidity of working, enough fuel may be mixed with the ore when it is charged into the kiln to heat it to the proper temperature, and use the heat of the combustion chamber only to maintain that temperature during the balance of the time occupied in oxidation. The ore should be broken into quite small pieces, and the very fine ore separated from it; otherwise it would take too long for oxidation to penetrate each piece, and the fine ore, if used, might clog the kiln. It will also be found desirable to draw the ore from the kiln as hot as possible, and cool it with a stream of water.

The rapid cooling of the surface of each piece has a tendency to burst the ore and make it still more porous. At the same time the water will assist to further oxidize the ore, and also to remove any sulphur that may remain by forming sulphureted hydrogen.

This kiln is adapted for the roasting of all ores, whether they be sulphurets, carbonates, or hydrates; for, although an oxidizing atmosphere is not necessary for the latter, yet the carbonic acid (CO^2) and water (H^2O) can be more readily and cheaply expelled by this kiln than any other known to me.

Claim.—1. The combination with an ore roasting kiln, of an air downtake, A, depending centrally within the kiln chamber, whereby the

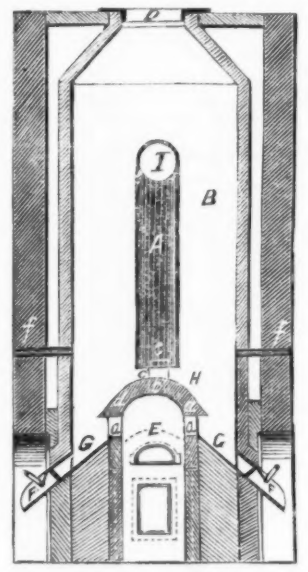


Fig. 2.

heated air will be diffused and discharged therefrom at a point above the combustion chamber.

2. The combination, in an ore roasting kiln, of a centrally located air downtake, A, with a centrally located fire and combustion chamber, E, beneath said downtake and separated from it, whereby the air is delivered at a point centrally upon the crown or arch of the combustion chamber, and diffused or turned aside uniformly into the ore chamber.

3. The combination, in an ore roasting kiln, of a centrally located downtake, A, with a centrally located fire and combustion chamber, E, provided with lateral and top flame and gas openings *a b*, whereby the upward issuing flames of combustion are brought into immediate contact with the inflowing currents of heated air from the downtake, to more equally distribute both the heat and the air.

4. The air downtake A, depending centrally from near the top of the kiln, and combined with the uptake C, joining the upper end of the downtake by the branch I, and extending down outside of the kiln, whereby the cold air entering at the top is caused to descend through the entire length of the central hot pipe.

5. The combination of two kilns B B for roasting ores with an air downtake, A, centrally located in each, supplied by a single uptake, C, built in the dividing wall of said kilns.

6. The combination, in a twin kiln for roasting ores, having centrally located air downtakes depending in each from or near the top, of the intermediate uptake C, having greater length and double the area of the combined downtakes.

7. The combination, in a twin kiln for roasting ores, of the centrally located fire and combustion chambers E in each, the centrally located air-downtake A therein, and the intermediate air-uptake C, having the relation to each other and co-operating to produce the results herein stated.

IMPROVEMENT IN CONVERTING OLD IRON INTO STEEL.

Specification forming part of Letters Patent No. 163,080, dated May 11, 1875, issued to Alexandre Jullien, of Paris, France.

This invention relates to certain improvements in the manufacture of steel from cast iron and wrought iron, combined with a percentage of ferro-manganese, the object being to utilize the old and comparatively worthless wrought iron in the market for the manufacture of steel.

It consists of a compound formed by melting in a Siemens-Martin or other suitable furnace, 1000 parts of cast iron, selecting that which contains less than one-thousandth part of phosphorus, and adding from time to time suitable quantities of wrought iron in the shape of old nails, axles, and the like, the whole quantity varying from 2500 to 3500 parts, according to the amount of carbon present in the cast iron. After the mass has all been reduced to a molten state, 65 parts, or thereabout, of ferro-manganese, containing about 60 per cent. of manganese, are added in fragments from time to time to the mass, and melted therewith. The materials must be quickly mixed during this process until the whole are thoroughly melted and combined, after which the compound may be run off into molds and formed into ingots.

In carrying out the invention, the following proportions have been found to answer well, although they may be considerably varied, according to the percentage of carbon in the cast iron. White cast iron, 1000 kilogramms; old wrought iron, such as old English rails, for instance, 2600 kilogramms; ferro-manganese, containing 55 per cent. of manganese, 65 kilogramms.

These materials are melted, as above described, and when completely combined are run into molds, and the alloy allowed to cool for use.

Claim.—The compound or alloy, consisting of wrought iron, cast iron and ferro-mangauese, combined in or about the proportions herein set forth.

Iron Making in the Central Presidency, India.

Mr. Walter Ness, who, it will be remembered, went out some time ago on behalf of the British government to superintend the development of the Worrora coal field in India, has sent a communication, dated Worrora Colliery, Central Presidency, June 29th, to the South Staffordshire Mill and Forge Managers' Association. He says he has now in hand the question as to whether the coal, and ironstone and iron ores of India can be profitably utilized. Ere this he expected to be ready to have made his tests on a practical scale, but he says: "I have such awkward hands to deal with that I am six or eight weeks short of that." When, however, he has got into what he terms real iron, he promises to send the association a copy of his notes. Mr. Ness, who is not only a mining engineer, but also a metallurgical chemist, has had enough experience in the making of iron commercially to depend too much upon any results he may obtain in his laboratory; but he is not without encouragement that his commercial tests may be all that he would desire, seeing that his scientific experiments have been cheering. Mr. Ness has made many tests on a laboratory scale, and these convince him that it is only a matter of adjustment in parts to get a result that will be a commercial success. The readers of *The Engineer* will not be surprised to hear that Mr. Ness does not expect to be able to do without the aid of machinery in the puddling of iron in India. Upon this subject he says: "I need not tell you that with weak native labor, and a climate such as this, hand puddling will not suit, neither do I think it will be necessary; but I cannot say more just now." Mr. Ness is not the man to be daunted by trifles, and we think that if it is possible for iron to be made from native ores and with native fuel, in such a climate, and with the aid of the labor which the district provides, Mr. Ness will accomplish it. The government of Great Britain may look forward to considerable saving in those items of their expenditure which now relate to coal and iron required in certain portions of our Indian Empire. The time of such economy has not, however, yet arrived; and British iron masters have not, therefore, much cause to fear any conspicuous falling off at an early day of their trade with British India.—*The Engineer.*

An Assayer's Paradise.—The *Mining Review*, of Georgetown, Colorado, has the following: Boulder county is the assayer's paradise. Not only can the diligent chemist find ores in plenty upon which to test his skill, but we doubt if there is a piece of rock in the entire county that would not consider itself a disgrace to its paternity if it did not go at least 1000 ounces, while the vast majority of bedrock and pebbles from the plains to the range, are capable of soaring up to five or ten thousand, without boasting in the least of the feat. And even if an unfortunate piece of granite finds itself lying around loose without a chunk of native silver or virgin gold, or a seam of ruby or glance attached, it never is happy until it has squared things by forming a close acquaintance with a piece of tellurium or bismuth, or some other wonderful and rare element. We reflect, with envy, how frequently the native assayer, there, must be forced to gather up his big assay buttons, melt them into a gold and silver brick, express them to Denver in his valise, and then follow to spend a few jolly days therewith in the metropolis.

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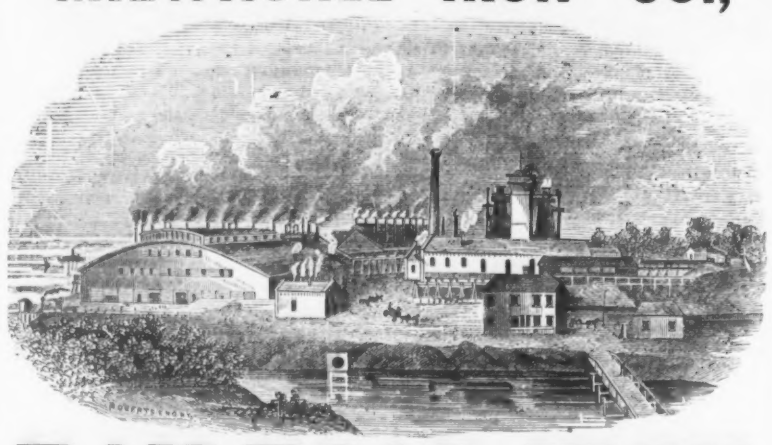

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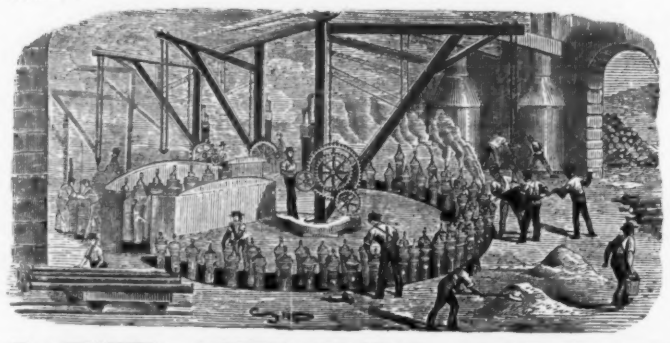

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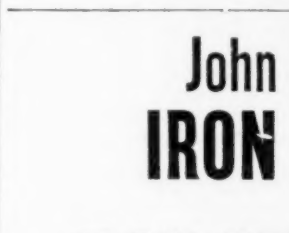

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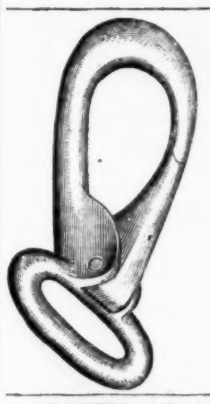

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The City of Pittsburgh.

A writer in the Boston *Commercial* gossips about Pittsburgh as follows:

On the 24th day of November, 1753, 122 years ago, George Washington, a young Virginian surveyor of 21, landed from his canoe upon the point of land formed by the confluence of the Allegheny and Monongahela rivers, where the city of Pittsburgh now stands, and was probably the first white man who ever set foot upon the spot.

A year or two later the French, who claimed all that portion of the country, becoming alarmed at the evident design of the English to take possession, erected a powerful fort upon the spot, which they named Du Quesne. This was the gathering point of the French and Indian forces at the beginning of that long and merciless war in which the soil of Pennsylvania was drenched with the blood not only of her soldiers, but of innocent women and children. Braddock's defeat, the details of which are familiar to every school boy, took place in the immediate vicinity, and just outside the walls of the fort, on the evening of that eventful day, 12 British soldiers, who had been taken prisoners, were burnt alive under the very eyes of the French commandant. Thrice during the two succeeding years was the fort besieged and the assailants driven back. The English and Provincials were determined upon driving the French from the country, however, and so stubbornly and persistantly did they push their endeavors that the fourth attack resulted in their favor. The French set fire to the fort and fled. The place was fortified in turn by the English, and named Fort Pitt, in honor of the celebrated English statesman. Hardly were the works completed before they were attacked by a large force of French and Indians. The English were too firmly intrenched, however, and though the attempt was several times repeated during the next two or three years, it failed on each occasion. The ending of the war found the British still in possession. The grasp of the French on the northern part of the continent had been shaken off forever, and there was no longer any necessity of retaining a large armed force within the fort. Shortly before the close of the strife a stone redoubt was erected by Col. Bouquet, the commandant, which substantial British relic still stands in good condition between Penn street and Duquesne Way. The visitor will recognize it by a tablet let in over the door with the date "1764" inscribed upon it.

No sooner was this trouble ended than a new one began. Virginia and Pennsylvania, whose troops had fought shoulder to shoulder against the French, now quarreled for possession, the former State claiming that region of the country under a charter granted by Charles I, and the latter under the same authority granted by James. A body of Virginia troops seized the fort and garrisoned it, and there seemed every prospect of an outbreak of hostilities between the two governments. Happily cooler counsels prevailed. A commission from the two States met at Baltimore and the matter was after long consideration amicably arranged. In 1764 no houses had been built outside the fort. In that year several streets were laid out, and settlers began to straggle in.

THE "SPIRIT" OF THE PITTSBURGH PIONEERS.

With remarkable sagacity and foresight these early pioneers of civilization, who at the head waters of the Ohio sought to plant their homes and assist in establishing on a sure basis the Republic, just sprung into being, that it might become an asylum for the oppressed who had come hither to escape the old despotisms of Europe, made sure work in securing to themselves the comforts they enjoyed at home, before even erecting a schoolhouse or a church, by building distilleries. In the same year of Lee's visit, 1784, two of these pioneers brought a copper still from Philadelphia and set it up with the same pious care that they might have exercised in erecting an altar, and they earnestly, and, no doubt, prayerfully, looked forward in anticipation of the fruits of their great enterprise. In 1786 the first church—Presbyterian—was built, and in 1787 an academy was established. These latter needed the fostering care of the State, but distilleries without such assistance, conducted simply by individual enterprise, multiplied rapidly, and became a power in the land.

In the annals of whiskey the region round about Pittsburgh is classic ground. The broad river which on one side embraces it, and along whose banks waved great fields of rye, has given a name to rye whiskey which has become familiar as a household word to the frequenters of every bar-room from Montreal to Texas. Drop into any place of the kind and you will find that wherever any indications of mercantile ability are exhibited, posted up alongside the sparkling decanters, cut glass bowls of white sugar and lemons, boxes of cigars, vases of peppermint, sand mirrors adorned with asparagus tops, is a card emblazoned with the thirst-suggesting inscription—"Pure Old Monongahela Rye Whiskey." It was the attempt to tax this staple that led to the famous whiskey insurrection in 1792, to suppress which cost the government nearly $1,000,000. The history of that popular rising has already appeared in the *Bulletin*, and its repetition is unnecessary.

If the traveler should approach Pittsburgh by night he would be forcibly reminded, if he had ever heard it, of James Parton's profane but suggestive simile, that the appearance of the city after dark was like "hell with the lid taken off." The entire landscape seems ablaze whichever way he may turn. These are not the forges, but what are called "coke ovens," in which coal is transformed from its primitive condition into coke. From 12,000,000 to 15,000,000 of bushels of this article are produced in the immediate vicinity of Pittsburgh, one-half of which goes to feed the fiery furnaces of the city itself.

As a manufacturing center, Pittsburgh is made up of two cities and eleven boroughs, covering an area of 25 square miles, and having a population of over 260,000. Its peculiar situation gives it access to over 12,000 miles of river navigation, affording carrying facilities of immense value. The two great rivers which inclose it are crossed by nine bridges, mostly of iron, over which the stream of traffic and travel constantly pours. The river shipping is as wonderful in its way as that of New Orleans, and it is claimed that the tonnage exceeds that of New York city. Some of the statistics furnished by official reports seem almost too incredible for belief. We are told that the city has 30 miles of factories in daily operation, twisted up into a compact tangle, all belching forth smoke, all glaring with fire, all swarming with workmen, all echoing with the clank of machinery. Actual measurement shows that there are within the limits of what the country calls Pittsburgh nearly 35 miles of manufactories of iron, of steel, of cotton and of brass alone, not mentioning manufactories of other materials, and including none of a less grade than chains in iron and plows in wood. Thus, in a distance of 35½ miles of streets there are 475 manufactories of iron, steel, cotton, oil, glass, brass, copper and wood, occupying less than 400 feet each, for these factories are so contiguous on the various streets of the city that if placed in a contiguous row they would reach 35 miles, and each establishment have less than the average front stated. The glass factories are over 70 in number, every quality of the article being manufactured, from the finest and most costly to the cheapest kind of bottle and window glass. The annual aggregate value of the production of these factories is estimated at over $7,000,000, or half the total value of all the glass made in the country. The entire extent of the manufactures of the city would require the use of more figures than we have at present room for, but it may be said that in 1874 over $10,000,000 worth of iron, $4,000,000 of steel and $3,000,000 of glass were produced by 41 of the leading firms in Pittsburgh in those three trades only.

Some of the iron and steel works are small towns in themselves. One of them covers an area of 20 acres, and contains 44 puddling furnaces, 2 blast furnaces, 22 heating furnaces, hot and cold rolling mills, iron and brass foundries, a nail mill, pattern and machine shops. Near by the owners of these works have erected 130 two-story brick houses which are tenanted by their workmen, while at their coal mines a collection of dwellings still larger, built for the use of their miners.

Until within the past eight or ten years English steel has been regarded as much superior to that of American manufacture, but to day as good an article, either cut or rolled, is turned out of the Pittsburgh shops as has ever been imported. American steel is fast supplanting the English on the European continent, and even the organ of the British manufacturers, the London *Ironmonger*, was moved a year or two since to say: "American bolts and hinges are said to excel ours, and medium American cutlery of all kinds to be cheaper and better than any manufactured, whether here or in other countries."

As a matter of course, Pittsburgh is one of the richest cities of the Union. Its banking capital is much larger than that of any other city of like size, and the only bank—the Bank of Pittsburgh—that has never suspended specie payment, is located here. We find it stated that this institution paid $1,300,000 of its liabilities in gold when it might have followed the example of other banks and paid in currency. This fact, if no other, ought to make Pittsburgh famous.

Crossing over into Allegheny City the visitor finds himself in a pleasanter atmosphere and with less noisy surroundings, though he by no means escapes the din of hammers and machinery which seems to form an atmosphere of sound about and around the smoky city and its suburbs. Many of the wealthier manufacturers, whose business is carried on in the city proper, have their residences on this side the Allegheny, and very tasteful and beautiful some of them are. The city contains nearly 75,000 inhabitants, and has 80 miles of paved streets, as well kept—the Alleghenians say better kept—than those of Boston. Several tasteful fountains are scattered through the municipality, and there are two or three public statues and monuments, the most notable of the latter being that erected to the memory of the soldiers from Allegheny county who fell during the war of the rebellion. This occupies the most elevated spot in the city—the summit of Seminary Hill, and overlooks the beautiful park which was laid out three or four years ago by the city government. From this hill, if a favorable time is chosen, an excellent view is had of the manufacturing portion of Pittsburgh.

The best view, however, is obtained from Coal Hill, across the Monongahela. The summit of this swart and precipitous elevation is reached by an inclined railway, a rather ticklish method of conveyance to the timid sight-seer, who grips the side of the car all the way up, tormented by the continual fear that something will give way. No accident has ever been known to happen, however, and if he go early enough, before the heavy blanket of smoke and coal dust settles down over the roofs and streets, he will be amply repaid by the view for all the trouble and time he has taken in the expedition. Standing here he can look down almost into the very mouths of the huge chimneys below, from which rise continually volumes of black smoke. Their number seems without end. He can see the course of both the great rivers as they gradually approach each other to mingle their waters in one. Within the vast triangle formed by the confluence, and on the opposite sides of the two rivers, he sees the rugged hills, honey-combed with "ovens" and filled with mineral treasures whose development has hardly begun. On the opposite Monongahela shore he can note the countless steamers and barges along the levee, and the multitude that are forever plying up stream and down; the bridges that span the twin streams are alive with traffic; while the heavy thud! thud! of the thousands of ponderous hammers seems to make the very hills pulsate.

One of the drawbacks to a residence in Pittsburgh is "that smoke!" Nobody can conceive its thickness or the amount of soot and dust deposited by it without personal experience. No one ever sees a lady dressed in white in the streets of that city. When she goes to the opera or a ball or to any female dress parade, she wraps herself up like a mummy, and goes in a coach almost hermetically sealed, so that the purity of her garments may be preserved. If a gentleman pays a visit or goes to a party, he carefully ties a pocket handkerchief about his neck, puts another like a bib, and carries his white kids in his pocket until safely within doors, and out of the reach of this floating and palpable blackness. The stranger who calls for a shave at a Pittsburgh barber not only has his "baird taken off," but he is surprised to find that the operator, in addition to the soaping and scraping which are generally supposed to constitute a shave, carefully and artistically washes his face, neck and ears.

Many of the stories told about Pittsburgh smoke may seem like exaggeration, but take the statement made by the Board of Trade in one of their circulars: "About 20 per cent. or one-fifth, of all the coal used in the factories and dwellings of the city escapes into the air in the form of smoke, being the finer and lighter particles of carbon contained in the coal, which, set free by fire, escapes unconsumed with the gases." Now, according to official figures, from 30,000,000 to 35,000,000 of bushels of coal are annually used in the city, and, as a consequence, if we are to rely upon the figures of the Board of Trade, 6,000,000 bushels of this amount "escapes unconsumed," in the form of smoke and coal dust, to finally settle back again upon the surface. It would be too curious and complicated a calculation to ascertain how much of this falls to a square foot. No doubt some statistician has done it, however, and some of our readers may be wiser in this respect than we.

Pittsburghers hold, and it must be acknowledged that their theory has a respectable foundation, that the inhalation of this smoke, which contains carbon, sulphur and iodine, is highly beneficial to those afflicted with lung and skin diseases, and assert that many wonderful cures have been performed by the patient simply taking up his residence there, and breathing the smoke daily. Whether this is so or not, Pittsburgh has the reputation of being the healthiest manufacturing city in the United States. The epidemics which from time to time ravage the country, rarely get a foot hold there, while there is certainly something in the atmosphere which gives the residents a hearty, healthy sort of look so different from that exhibited by the inhabitants of most manufacturing places.

It is well known that a large number, perhaps a majority, of the laborers and operatives in the great establishments of which we have spoken are foreigners—Irish, English, Germans and Welsh. The latter nationality is better represented, perhaps, than any other, especially in the great iron works. These people come from their own country as skilled workmen, and receive the highest pay. They very largely monopolize the best places. One would imagine that such a commingling of races would result in a rather unsettled community. In former times there used to be considerable clashing, and an occasional murder in a street or saloon brawl was not uncommon. There has been a great change for the better, however, within the past two decades. Immigration from abroad has fallen off very considerably, and the American born of the last one or two generations do not partake of the national feelings and prejudices which made their fathers enemies. Education has done much, too, in this direction.

If one wishes to get a fair sight of this grand army of iron workers in a washed up condition, let him take a stroll late of a Saturday afternoon or evening in the principal streets of the city proper, or in the vicinity of the markets. Saturday is a half holiday in most of the works, and the operatives make up for their nearly six days' confinement in these fiery furnaces by dressing in their best and promenading the main thoroughfares. The shopping for the week is done on that day, and so, as everywhere else, is the marketing for Sunday. They live well, these stalwart gentlemen, and it is a question whether their employers pay for choicer joints or more toothsome viands generally than they. Although they look like veritable demons when one sees them, half naked, darting about in the lurid light of their forges, they are a jolly looking set when outside, after having been subjected to the Christianizing influences of soap and water and a change of clothes. Possibly they are a trifle rough in their manners, and Richard Grant White would very likely have something to say in the way of disparagement of their grammar, but, taken as a whole, they are as peaceful and well behaved as those whom society persists in regarding their "betters."

During the recent building of a bridge in Holland, one of the traverses, 460 feet long, was misplaced on the supports. It was an inch out of line, and the problem was how to replace it. The night and day temperatures differed by about 25°, and it was thought this might be made to move the bridge. In the morning one end of the pieces was bolted down securely, and the other end left free. In the heat of the sun the iron expanded, and toward night the bolted end was loosened. The contraction then dragged the whole mass the other way. For two days this experiment was repeated, and the desired place reached. The contraction and expansion of iron bars by fire heat has frequently been used to move heavy weights over short distances. Broken walls and strained roofs and arches have been brought into place by simply heating iron rods till they expanded, then taking the slack by screws and nuts, and allowing contraction by cold to pull the wall or roof into place.

USE THE BEST.

Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

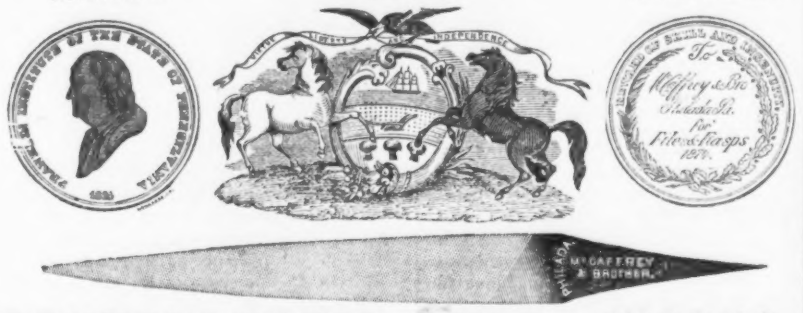
Price lists and information furnished on application.

AMERICAN FILE CO., Pawtucket, R. I.

THE BEST IS THE CHEAPEST.

McCaffrey's Standard American Hand Cut Files and Rasps are warranted to do more work than any other files and rasps in the market.

SILVER MEDAL. TRADE MARK. HIGHEST PREMIUM.



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No. 1732, 1734 & 1736 North Fourth St., Phila.

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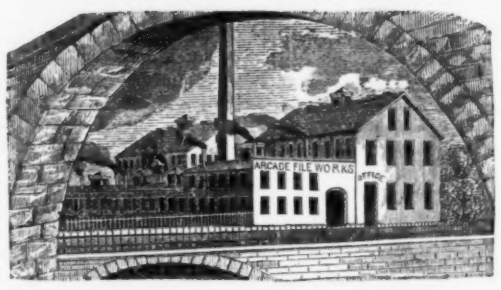
Manufacturers of SUPERIOR
HAND CUT



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Made from Best
ENGLISH CAST STEEL.
Quality guaranteed by written warranty when required.

Eagle File Works. **Established 1857.**

Madden & Cockayne File Co.

(Late WHEELER, CLEMSON & CO.)

Manufacturers of the

Old and Well Known "WHEELER, MADDEN & CLEMSON" Brand of

FILES.

Middletown, Orange Co., NEW YORK.

WHIPPLE'S PATENT
Door Knob.

THE WHIPPLE DOOR KNOB

Is the only perfect Door Knob Attachment ever invented.

AWARDED A BRONZE MEDAL

At the American Institute Fair, in New York, for 1874.

NO SCREWS USED IN NECK OR ROSES.

Adjusts Perfectly to Doors of Different Thicknesses

WITHOUT THE USE OF RINGS.

The attention of Architects, Builders and Carpenters is specially desired. Circulars fully describing the advantages of this Knob, with Price List, sent on application to

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L. B. HELLER & CO.,

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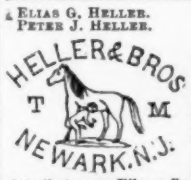

We invite the attention of the trade to our **Celebrated American Horse Rasps and Files.** These Rasps are made from the very best American Steel, all cut by hand, and we warrant them equal to any other make in the market. For the information of persons unacquainted with our goods, we will state that every File or Rasp manufactured by us, since our establishment in 1866, have been stamped "*Heller & Bros.*" though commonly called the "*Heller Rasp.*" All Rasps not stamped as annexed diagram are not genuine. We will send sample lot, if requested, and if not as represented they can be returned, or held subject to our order, free of all charges. For sale by the leading Hardware Dealers in the United States.

Clement & Hawkes Mfg. Co.,

Manufacturers of

SHOVELS,

Planters' Hoes, Trowels and Machinery.

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HORSE SHOE NAILS.

Manufactured from the best of **NORWAY** Iron, and warranted to give entire satisfaction.

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The Backus Water Motor,

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What They will do.

These Motors are adapted to running light machinery, such as Coffee Mills, Printing Presses, Lathes, Drug Mills, Church Organs, Sausage Cutters, Ice Cream Freezers, Elevators, Hoisting Machines and everything requiring similar power, in cities or towns where there are Water Works.

And the best "Motor" in the world for family sewing machines. Send for Circular.

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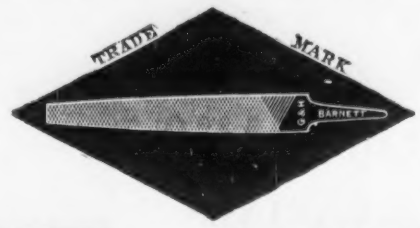

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Established 1816.

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SOLE AGENTS FOR

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FILES AND HORSE RASPS,

And Importers of

P. S. STUBS' FILES, TOOLS & STEEL,

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AUBURN FILE WORKS,

Superior Hand-Cut

FILES AND RASPS,

MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.

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JOHN ROTHERY'S

Celebrated Hand-Cut FILES,

Made of Best English Cast Steel.

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FLOWER POT STANDS,

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French Bronze Butts,

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Tredegar Horse and Mule Shoes.

These superior Shoes are made of the Best Virginia Charcoal Iron. They are well adapted to Western and Southern demand, and are shipped to all prominent markets at freights as low as on other makes.

THE TREDEGAR COMPANY, Manufacturers,

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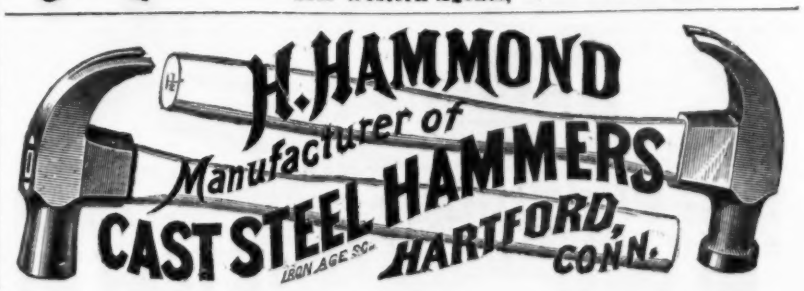
SEMPLE, BIRGE & CO., Sole Western Agents, } ST. LOUIS, MO.



BUSINESS ITEMS.

NEW YORK.

We take the following from *The Seneca Falls Reveille*, of recent date: Rumsey & Co., Seneca Falls, have taken store No. 93 Liberty street, New York, and are now filling it up with a full line of their pumps, comprising over four hundred different styles and sizes, also fire engines and other wares of their manufacture. This makes their seventh branch house, where they keep in stock a full line of their wares, viz.: No. 93 Liberty street, New York city, Chicago, Ill., St. Louis, San Francisco, Liverpool, England, Madrid, Spain, and Hamburg, Germany. Rumsey & Co. are making full time, and give employment to over two hundred workmen. They have orders for and are now shipping fire engines for Mascoutah, Ill., Indianola, Texas, Maysville, Ky., Tolusa, California, Columbia, Furnace, Va., and Exeter, Canada. We are pleased to record an example of such great success in business as is shown by this firm of manufacturers, and it speaks a double praise to their business ability, that their manufacturing interests are so rapidly strengthening and expanding, at a time when others are complaining of dull trade and hard times. However great their success, everybody is pleased to see it, and Seneca Falls has much reason to feel proud that from its center radiates a business of such extent and magnitude. The gentlemen composing the firm of Rumsey & Co. are men of sterling integrity and more than usual business ability, and they have obtained an established position in the business interests of the world that is as truly enviable as it is well merited.

Perry & Co., of Albany, stove manufacturers, are now conducting three large foundries, with an aggregate capacity for the production of 60,000 stoves, and employing 600 men. The firm have run their two largest foundries on full time since the 10th of January last, and the third since early in August. Notwithstanding this large production, we are informed that they are unable to keep up with their orders. The branch houses at Chicago and New York are very busy, which is a favorable indication of the state of trade.

The shops of John Stephenson & Co., in this city, have recently completed and shipped several cars for the St. Petersburgh Tramway Company, of St. Petersburg, Russia. That company has also ordered several cars from English and Belgian makers, which are to be used in competition with the American cars, and the final contract for a large number of cars will be given to the maker whose work proves most satisfactory. The cars are somewhat different than those in this country, being arranged for 22 seats inside, and the same number on the top. The length of the cars is 26 feet. As no passengers will be allowed to stand, the cars, when loaded, can be drawn by two horses. The roofs are curved, and the seats on top are reached by stairways at each end of the car. The empty cars weigh about 4650 pounds, and cost at schedule prices, $1125 each.

The Bradley Manufacturing Company, Syracuse, have the r machinery perfected for manufacturing wrought iron whiffletree hooks, and are ready to fill orders for manufacturers and dealers. These hooks are made with their cushioned hammers.

Work in the Herkimer Axle Works has resumed after a suspension of several weeks. Other mills and manufactories in the valley that have been idle for several weeks of late are now again in operation.

PENNSYLVANIA.

A new furnace has just been put in the butt-welding department of the National Tube Works, McKeesport. It is designed for a new process in welding.

MASSACHUSETTS.

Hayden, Gere & Co., of Haydenville, in common with other manufacturers, have been obliged to reduce the pay of their help some 10 per cent. on the average. Considerable grumbling, of course, has been done, and some fifty hands have left the works, thinking they can do better elsewhere. Nearly all of these are French people. The new works are now all roofed in, and the Wood & Light Machine Company, of Worcester, have put in 1000 feet of main shafting, the company furnishing their own counter shafting. The company expect now to occupy their new shops by October 1st. The works will give plenty of room for 600 men, but unless there is an increase of business the company will not increase their present quota of help, which is about 200.

It is now about eight months since the change in the management of the Ames Company, of Chicopee, by which Clifford Arrick, of Washington, became its president, and A. C. Woodworth its agent, and under the new direction the works have already become more active than at any previous time since the war. At present they employ about 425 hands, but will be obliged to increase their force to dispose of the contracts which they already have, to say nothing of possible ones in the near future. The latest contract that the company have taken is for the manufacture of 200,000 bayonet scabbards to go with the Martini-Henry rifles, which the Providence Tool Company are making for the Turkish government. The bayonets are different from any in use in this country, being four-cornered instead of triangular, as are those in common use, and these scabbards accordingly will be square to match. The company will fit up their old workshop for this class of work. This job alone will require from 10 to 12 months, the scabbards being delivered at the rate of 500 to 1000 a day. In their sword department, the company have orders for six months head, without reference to their special contracts.

OHIO.

Messrs. Blakeslee & Mills, Cleveland, are about establishing a new bolt and rivet manufactory. Mr. Blakeslee is the patentee of a bolt and rivet machine that possesses many advantages over the ordinary machine. This machine has a capacity equal to six tons of railroad bolts per day.

The Smith Bridge Company, of Toledo, have just completed a bridge in Danville, Pa.

Messrs. Clark & Co.'s Cast Steel File Works, Dayton, is running with a full set of hands. They manufacture Clark's horse rasp and all kinds of files.

NEW HAMPSHIRE.

One of Cook's turbine water wheels, manufactured at Lake Village, has been put into the paper mill at Henniker, capable of furnishing about 90 horse-power, and will run six engines as easily as the one heretofore used could four.

VERMONT.

The rail mill of the St. Albans Iron and Steel Works has suspended indefinitely for lack of work, throwing 125 men out of employment.

The St. Johnsbury scale manufacturers have just received an order for four of their patent iron frame track scales for a leading Continental railway, and a leading Englishrailroad is now putting in these standard scales.

The Fulton Foundry, at Sandusky, is running on car wheels and the newly patented street car turn table, the invention of Mr. S. M. Carpenter, from 40 to 50 of which have been ordered since their first introduction last November. The table is of iron throughout, and is the very perfection of simplicity, without a single element of weakness or wear in its construction. Several are in use in the city, and some that have been in operation during the greater part of a year have not in that time required any repairs, nor is there any present indication of wear or breakage in any of its parts.

The Cleveland Iron Co. have the contract for rails for the Sharon Road, which connects Sharpsville with Sharon, ten miles in length.

The Steubenville Bolt Works have been sold by the sheriff for $33,336, or 33⅓ cents more than one-third what it cost to establish them.

Messrs. Lord, Bowler & Co., Cleveland, have just completed an engine, boiler, wax cooler and elevator for the Lubricating Oil Works of C. L. Morehouse & Son. They have also recently placed one of their 6x12 engines in the Parlor Grate Works of D. L. Lowrie. The monster engine that furnishes the power in Power Hall of the Northern Ohio Fair, which is now in full operation, was built by this firm.

The Toledo Stove Company employ 30 persons in their foundry. Their productions are stoves and hollow ware.

The Novelty Works, Toledo, make engines, saw mill castings, &c., &c., and give employment to about 50 persons.

The locomotive shops of the Atlantic and Great Western Railway, with a light force working but nine hours per day, turned out a new locomotive, complete, in 27 working days.

The Cleveland Lead Pipe and Sheet Lead Works, Gibson, Roberts & Price, are turning out from five to six tons of sheet lead and from four to five tons of lead pipe a day in their new works, Nos. 69 and 71 Columbus street.

ILLINOIS.

According to the *Western Manufacturer*, the Furst & Bradley Manufacturing Company, of Chicago, recently received orders for their celebrated Garden City clipper plows from the following distant points: 1000 from San Francisco, 1000 from Oregon, and over 3000 from Texas. They have also this season received several good orders for their goods from Australia, Berlin, and other foreign countries.

MARYLAND.

The highest bridge in the world will be built at the crossing of the Kentucky River, on the Cincinnati Southern Railway, near the Shaker ferry. The Baltimore Bridge Company, one of the most noted in the United States, has secured the contract. The bridge will consist of an iron deck truss of three spans of 375 feet each, center to center, supported by two piers and two abutments. The piers will be built of masonry to a hight of 64 feet and 6 inches above low-water mark, and the additional distance below low-water mark will soon be determined by borings under control of the resident engineer. These piers will be 120 feet long, end to end of cut water, and 35 wide on the top, built hollow, with the walls 24 feet from the end. Upon the masonry will rest the iron trestle work. The grade line is 275 feet 6 inches above low water. The abutments will be built upon the cliffs on each side of the river, and are to be 48 feet high, depending upon the shape of the ledges of rock.

Wooden Rails.—The superintendent of the Muncy Creek Railroad is about to try the experiment of laying wooden rails on that portion of the road between Hughesville and Tivoli, or two miles beyond. With a view to testing the feasibility of wooden rails, the superintendent recently had seven hundred feet of track laid on a curve just beyond Muncy Creek, and to the surprise of all it has been found to answer the purpose much better than was anticipated. The rails are of sugar maple, 7 by 4 inches, and about 12 feet in length. The ties are laid down in the ordinary way, notched, and the rails "let into them" about 4 inches. They are then keyed firmly with wooden wedges driven on the sides, which makes the track very solid and firm. The locomotive and heavy cars have been passed over this experimental track at different rates of speed, and it has been found to work admirably, and give every assurance of success. The cost of laying wooden rails, manufactured out of this hard material—that becomes almost as solid as bone when seasoned—is $450 per mile. Iron costs $4000 per mile. No iron spikes are required, as the rails are secured with wooden wedges, and the cost of track laying is about the same as putting down iron. These wooden tracks have been tried at different places in the country, and invariably been found to work well.

GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF

Wood Screws, Steel in Sheets,

BAND SAWS. TOOLS FOR BRAZING, &c.

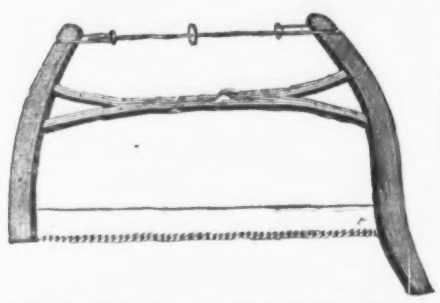
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

H. W. PEACE,

MANUFACTURER OF

Saws of all kinds.

FACTORY, WILLIAMSBURGH, N. Y.



Elliptic Forked Saw Frame.

Patented June 28th, 1870.

The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,
Sole Proprietor & Manufacturer,
VULCAN SAW WORKS.
WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

Manufacturers of

Movable Toothed Circular Saws,

PERFORATED CROSS-CUT SAWS

And SOLID SAWS of all kinds. Trenton, N. J.

THE SILVER STEEL

DIAMOND CROSS-CUT SAW.

$1.50 Per Foot.

PATENT HANDLES AND GAUGE INCLUDED.

Patent Secured

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND EASE**, is manufactured by **E. C. ATKINS & CO., Indianapolis, Ind.**, who are the

SOLE MANUFACTURERS FOR THE UNITED STATES.

So confident are we that this is the best Cross-cut Saw in the market that we CHALLENGE THE WORLD. Orders promptly filled.

E. C. ATKINS. H. KNIPPENBERG. **E. C. ATKINS & CO.**
Saw Manufacturers and Repairers, Indianapolis, Ind.

Lloyd, Supplee & Walton,

HARDWARE FACTORS.

MANUFACTURERS OF

Bonney's Hollow AUGERS.

Stearn's Hollow Augers and Saw Vises

Bonney's Spoke Trimmers

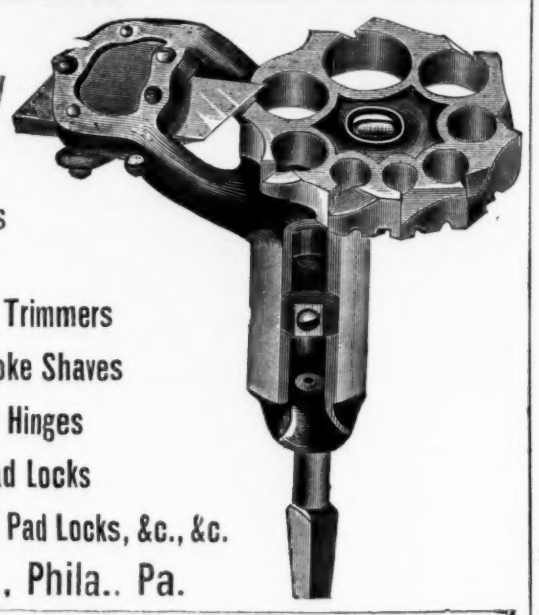
Double Edge Sooke Shaves

Adjustable Gate Hinges

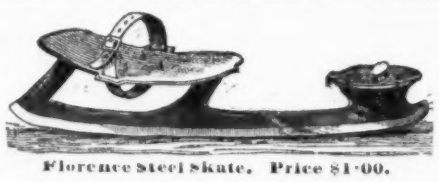
Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.



Florence All-Clamp Skate, Price $3·50.



Florence Steel Skate. Price $1·00.

FLORENCE SKATES.

MANUFACTURED BY THE

Florence Sewing Machine Co.,

FLORENCE, MASS.

The Florence Steel Skates.

"The Skate for the Million!"

The Florence Spring Skates.

The Most Elegant and Perfect Skate in the Market.

☞ Send for Illustrated Price List.

Florence Clamp and Strap Skate. Price $3·00.

Every Skate warranted Steel, and free from any Imperfection.

☞ *CAUTION!* A Cast Iron Skate is now being offered to the trade for 70 cents, made in imitation of, and often mistaken for, our one dollar Steel Skate. This 70 cent Cast Iron Skate can easily be broken with the hands.

All persons are hereby cautioned that we shall prosecute infringers of Letters Patent No. 154,176, Aug. 18th, 187 ; and reissue of same, No. 6410, May 4th, 1875, granted to Oliver Edwards, under which the Florence Steel Skate is manufactured.

THE FLORENCE SEWING MACHINE CO.,
WILLIAM B. HALE, PRESIDENT.

Wheeler, Madden & Clemson MFG. CO.,

MIDDLETOWN, - - - - NEW YORK.

Manufacturers of

WARRANTED CAST STEEL

SAWS

Of every description, including

Circular, Shingle, Cross-Cut, Mill, Hand, WOOD SAWS, Etc., Etc.

E. M. Boynton,

80 Beekman Street,
NEW YORK,

Manufacturer of

Saws of all kinds.

Also Sole Manufacturer of

LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.

Note extra steel and durability over the old **V**, outlined on **M** tooth.

Telegram Dated Oct. 1st, 1874.

STATE FAIR, EASTON, PA.

To HENRY DISSTON & SONS:

Philadelphia, Pa.

I want you to publicly test that challenge on Cross Cut Saws. Name time and place within thirty days. American Institute preferred. E. M. BOYNTON.

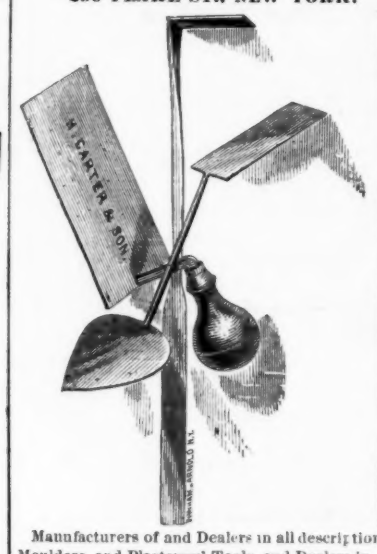
E. M. Boynton gave on Wednesday of last week an exhibition of what his Lightning Saw could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his saws to Australia and other distant markets.—*The Iron Age*, Oct. 8, 1874.

For fuller report of this exhibition see the *Easton Morning Dispatch* of Oct. 1st, 1874.

Henry Disston & Sons cannot furnish Lightning Saws. Why do they imitate mine?

H. CARTER,

290 PEARL ST., NEW YORK.



Moulders' and Plasterers' Tools.

Manufacturers of and Dealers in all descriptions of Moulders and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes.

CARTER'S PATENT CARRIAGE LIFTING JACK A

HOOKS SMELTING CO.

MANUFACTURERS OF

Babbit Metal,

Car Bearings, Brass and Composition Castings.

RAILWAY and MACHINISTS' **SUPPLIES.**

Philadelphia, Pa.

WILSON BOHANNAN,

Manufacturer of Patent

Brass Spring PAD LOCKS.

Improved Flat Steel Key Pad Locks.

Passenger Car Locks, Bronze, Nickel Plated and Japanned.

For Railroad Switches, Freight Cars, &c.

Cor. Broadway & Kossuth Street, Brooklyn, E. D., N. Y.

make a specialty of the LARGEST SIZES of **Circular Saws**, and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am sole proprietor and manufacturer of the celebrated **"Challenge" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

JAMES OHLEN.

J. FLINT,

Manufacturer of

ALL KINDS OF

SAWS

And Plastering Trowels,

ROCHESTER, N. Y.

A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for Illustrated Price List.

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Hardware Commission Merchants.

BIRMINGHAM, - ENGLAND,

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At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

John Rimmer & Son's Celebrated Harness and other Needles.

Agents for

Seydel's "Ashantee" Pocket Hammock

OSCAR IRVING VAN WART & Co.,

FORWARDING AGENTS.

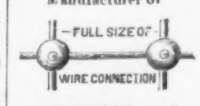
2 South John Street, LIVERPOOL.

JOHN MAXHEIMER,

Patented,

June 3, 1862; April 6, 1869; Dec 23, 1873; Jan. 20, 1874; Dec. 22, 1874.

Manufacturer of



JAPANNED and PATENT EUREKA Bright Metal

BIRD CAGES.

Nos. 247 & 249 Pearl Street NEW YORK.

LE COUNT'S

Pat. Machinists' Tools.

REDUCED PRICES.

Set Iron Dogs,	⅜ to 2 in.	$ 5·60
" " "	⅜ to 4 in.	12·00
" Steel "	⅜ to 2 in.	6·30
" " "	⅜ to 4 in.	13·00

Iron and Steel Clamps, Die Dogs, Clamp Dogs,

Vise Clamps, Expanding Mandrels, &c.

Send for latest Price Lists to

C. W. LE COUNT,
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ZERO

REFRIGERATOR.

With Water, Wine and Milk Cooler, is the best Meat, Fish, Fruit, Ice and Health Keeper in the World. 30,000 in use. Call or send for catalogue.

ALEX. M. LESLEY, Manufacturer,
226 West 23d Street, N. Y.

PEUGEOT FRÈRES,

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MANUFACTURERS OF

Every description of Saws, Edge Tools, Compasses, Wrenches, Braces, Hammers, New Patent Parallel Hand and Bench Vises, Patent Screw Boxes, Screw Drivers, Bits, Tinmans' Shears, Horse Clippers, &c., &c

COFFEE MILLS,

Doctors, Clock and Telegraph Springs, Rolled Steel for various purposes; as Saws, Watch and Clock Springs, Corsets, Crinolines, &c.

PEUGEOT'S CELEBRATED BAND SAWS.

Works at VALENTIGNEY, HERIMONCOURT, BEAULIEU, &c.

PARIS OFFICES, 2 RUE BERANGER 2.

First Gold Medal, 1819.

For Prices and Illustrated Lists, send to

MR. AD. ARBENZ, St. Nicholas Hotel, NEW YORK

THE CELEBRATED

Yale Locks

FOR ALL USES.

Ornamental Real Bronze Hardware.

YALE LOCK MFG. CO., Stamford, Conn.

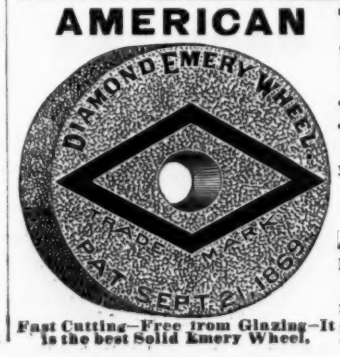
Salesroom, No. 298 Broadway, New York.

AMERICAN TWIST DRILL CO.,

Woonsocket, - - RHODE ISLAND.

Sole Manufacturers of the celebrated

Diamond Solid Emery Wheel



Fast Cutting—Free from Glazing—It is the best Solid Emery Wheel.

Prices: 10x1, $2·90; 14x2, $9·75; 18x2¼, $20·00; 24x3, $42·00. All other sizes at proportionate prices. State diameter of Holes in your orders for Wheels.

MANUFACTURERS OF

PATENT EMERY WHEEL MACHINERY,

And Automatic Knife Grinders

For the rapid and perfect grinding of Planer, Paper Cutting, Leather Splitting and other long Knives.

These goods are unsurpassed for elegance of design, workmanship, capacity and durability. First premium awarded by American Institute, N. Y., 1870 and '73; Medal and Diploma by M. C. M. A., Boston, 1874.

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Sept. 20, 1875.

Whatever there has been expected of fall trade is now being more or less realized, for we are in the midst of the season, and already preparations are making for winter. Probably there has been a much more active business done than is supposed, and the summing up of the years' trade at the close of December will show a much more satisfactory state of affairs than we have thought for. The effects of the coming Centennial upon our city are already clearly visible, and each day increasing.

What a great city requires in paving, lighting, water supply and park accommodation, and what it contains in dwellings, factories, population and value of real and personal property, furnish interesting food for thought. A careful summary of these items, collated for a contemporary, shows them in a most forcible light, and at the risk of the charge of blowing the Philadelphia trumpet too strongly, I repeat a portion. In an area of 82,803 acres, or 129.38 square miles, Philadelphia has a population of 800,000 people, who, from more than 9000 factories, produce goods and wares to the value of $350,000,000, employing a capital in their production of $185,000,000, exporting over $24,000,000 of them, and importing a like amount, on which duties to the amount of $8,500,000 in gold are paid. Such a city, in the nature of things, and especially in these days of rings, must have a large debt, which, in our case, amounts to no less than $64,290,464,05, but which is provided for by a tax of $2·15 per $100 upon a value of real and personal property of no less than $575,238,938, or nearly *six hundred million dollars.* To light such a city, and supply the greater part of its population with gas, requires 1,766,268,000 cubic feet, conducted through 612 miles of gas mains, and a part of which is burned in 9005 street lamps. To supply it with water requires 14,533,425,097 gallons, figures which run into *trillions.* This is conducted through 628 miles of main pipe. For highway accommodation there are 650 miles of paved streets and 450 bridges, great and small; and for drainage 375 miles of sewers. To transport the population are needed 642 street cars, and used in business 2500 drays, wagons, carts, &c. To provide police force requires 2475 men, and to educate the children of such a great city 467 free schools with 2000 teachers and 108,631 pupils, with school property to the value of over five million dollars. To guard against fire needs a fire department including 401 men, 34 steam engines, 4 hand engines, 11 hook and ladder trucks, 27 hose carts and 6 fuel wagons, and a special fire alarm telegraph system. For the recreation of this city is provided in one park alone 2740 acres of pleasure ground, in which are 31 miles of carriage road, 20 miles of foot walks, 10 miles of bridle paths, 29 miles of drains and sewers. The population lives and does business, or did January 1, 1875, in 145,001 buildings, of which 133,343 are dwellings, and 11,658 stores, factories and other buildings. Such are some of the figures, boiled down, which show what a great city is and must have to enable its population to live and move and have their being. They are more than dry statistics, these figures, and cannot but prove of interest to all who watch the progress of our Centennial city.

At the last meeting of the Franklin Institute, a resolution was adopted appointing a committee to test the strength of irons and steels employed in the construction of boilers and bridges, and appropriating $1000 for expenses of conducting the test; also a congratulatory resolution on the establishment of a Museum of Industrial Art in this city, and a committee appointed to assist in the organization of such a museum. In relation to this Museum of Industrial Art, some interesting facts were disclosed at a meeting of the projectors with the Centennial and Finance Committees of the City Councils, on the 18th. The plan proposes a museum similar to the South Kensington Museum, of London, to develop our art industries by the best examples, free lectures on technical subjects and schools. The address stated that the commercial value of our manufactured products depends upon the art character of the work more than on raw material or cost. In many cases the taste in the design really forms almost the whole value, and while abroad this taste has been developed, in this country, for want of such schools and museums, notwithstanding our resources, we are still compelled to import what we ought to make. The history of the Universal Exhibition of 1857, in England, showed that that country found itself at the foot of the list in art manufactures. Art schools were established in every large town, and in 1867, at Paris, England stood amongst the foremost. Massachusetts has already made a movement in industrial art education, and in March last our citizens interested formed the project of a similar system here, and were addressed by Mr. Walter Smith, the State director of art education for Massachusetts. In June, Mr. P. Cunliffe Owen, Director of the South Kensington Museum, London, and British Commissioner to the Centennial, when here, expressed great interest in the plan, and pointed out the suitability of Memorial Hall for the purpose, both from its design as a permanent museum of art, and also from the unusual opportunity afforded by the Exhibition to secure the very best samples of the products of all the nations of the world. The projectors of the Philadelphia Industrial Art Museum have therefore urged on the resentatives of the city government the necessity of their aid in granting the Memorial Building, after the exhibition, for this purpose; in support of which they presented letters from the Academy of Fine Arts, Franklin Institute, University of Pennsylvania, School of Design, and other bodies. The co-operation of the city government was promised, and that of the State will speedily follow. This is one of the most important movements of the day to our city, and will receive hearty support.

While Roach is continuing the construction of an iron fleet, our city builders are not idle. Cramp & Sons having just launched, for the Alaska Commercial Company, of San Francisco, the steamship St. Paul, a fine new ship of 1000 tons, 200 feet long, 31 feet beam, and of extra construction throughout, and supplied with compound engines. As expected, the committee of experts, at San Francisco, who have examined the City of Peking, pronounce her as having suffered only slight damage by improper loading, but not injured or unseaworthy, and consequently nail the free trade lie of her having been badly constructed. Had she been Clyde built, and stevedored as she was, she never would have reached a port to be examined in. We have another new American line of steamers, started by W. P. Clyde & Co., from your city, to Hayti, and run by Delaware built iron steamers.

The Wilmington *Commercial* of late date gives an account of the introduction of American machinery, from Wilmington, into the government shops at Konigsbronn, in Wurtemberg, Germany. This is machinery to grind and polish calender rolls used in paper making. The American machine performed *in eight hours* the work of grinding and polishing a calender roll, which the German tools in use required *twenty-nine days to do.* So much for American industrial progress.

The Chester Edge Tool Works has reopened after a suspension of eight months, having been bought by Henry B. Black, of Morton, Black & Bros.

In the coal trade there are troublous times, and signs of the combination being broken. Lehigh coals are selling lower than Schuylkill, and some Schuylkill dealers "cutting" combination prices. It has made a great deal of talk, and sharp action is expected from the Coal and Iron Company to protect itself. Rumor states that 12 furnaces have come into the offer of the Coal and Iron Company, and will soon blow in.

The Baxter steam street car is being tested upon one of our suburban horse railroads, and if satisfactory, it is proposed to adopt it generally upon all the lines. Some adaptation of steam power appears necessary on our street railways, and that named is at present the most practicable.

The Towne Scientific School of the University of Pennsylvania opened its first session this week with a class of 50 students. This department is supported by a bequest of $1,000,000 from the late John H. Towne, and is thoroughly supplied with apparatus, laboratory, &c., museums, lecture and drawing rooms for a full course of study in chemistry, metallurgy, geology, civil and dynamic engineering, and physics and architecture. The faculty includes such men as Profs. Lesley, Genth, Barker, Franck, Haupt and Koenig in the scientific chairs, and cannot fail to make the school take at once a prominent place in the ranks of scientific education. The approaching winter promises to be particularly brilliant in science and art, as well as in technological information, and to produce matter of great industrial importance to our people.

The Brooklyn Bridge Anchorages.

To those who have daily crossed the Roosevelt street ferry from this city, the destruction of a number of the dens and rookeries in Cherry and Dover streets, in order to make way for the New York anchorage of the bridge, has been a matter of congratulation, no doubt. The following are some of the details about the anchorage and approaches, and will probably satisfy the curiosity of those who have attempted to understand what was going on behind the high fences surrounding part of the block.

The New York anchorage will take up nearly half of the block bounded by Cherry, Water, Roosevelt and Dover streets. The base of the anchorage is 141x120 feet, and the structure will rise 80 feet above the sidewalk on Water street and 65 feet above the Cherry street sidewalk. It will consume 500,000 feet of timber and 30,000 cubic yards of stone. The weight will be 60,000 tons. Four large warehouses, three stores and several tenement houses had to be removed to make room. The structure is raised by courses, the bottom course being of timber and concrete. The timber is Georgia or Florida pine, 12x12 inches, put in layers, alternately lengthwise and crosswise, and firmly bolted together, the timbers in each layer being from two to six inches apart, and the interspaces filled up with concrete. This bottom wooden course is already down, and one course of stone, two feet deep, is laid over it. It is expected that the structure will be completed in about a year.

The distance from the southern face of the anchorage to the center of the great pier is 930 feet, and it is 1300 feet from the northern face of the anchorage to the end of the approach on Printing House Square. The anchorage will receive four cables, descending from the top of the tower and entering the anchorage about 70 feet above the ground, so that they clear the roofs of the tallest buildings that stand in their line. These cables will be 16 inches in diameter, made of steel. They enter the anchorage horizontally, and run along through tunnels a distance of 25 feet, when the strands, of which there are 19 in each cable, separate, and each strand takes hold of two links of a loop of chain, which makes 38 links to receive one cable. The two cables thus merge into 4 great chains which pass on through the anchorage in a curved line until they reach the bottom and are made fast to the plates put there to receive them. These four plates are of cast iron, 17½ feet long by 16 feet wide, each weighing 25 tons. The top surface is flat and the bottom convex. The great stones above the plates overlap each other in such a way that the anchor plates cannot rise without carrying up the whole mass.

The line of the bridge crossing from Brooklyn, strikes South street on the New York shore, midway between Dover and Roosevelt streets. At this point the roadway of the bridge is high above the roofs of the buildings, but all that fall within the line of the approach will have to be demolished and replaced with fire-proof buildings for safety to the bridge.

With a sweep of 85 feet the approach passes over Front street on a line two doors east of Dover, and thence over the warehouses, tenements and sailors' boarding houses on Water street, through to Pearl street or Franklin Square. The roadway, which is all the time descending, takes off the roofs of the tall five-story buildings on the north side of Franklin Square and demolishes one corner of another tall triangular building, which encroaches a little too far at the junction of Pearl and Cherry streets. North of Pearl street the natural surface of the ground descends rapidly for some distance, and then ascends almost as suddenly till it reaches the level of Printing House Square. On account of this most of the roofs between Franklin Square and William street escape; but all the buildings above Rose street will have to be razed to the ground before the approach can be built. The approach terminates finally on a level with Tryon Row or Printing House Square, and, coming out at the base of the *Daily News* building, scoops that structure.

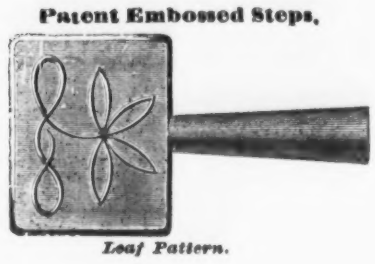
The approach cuts off three buildings from the north side of Cliff street, beginning at Frankfort street, and six buildings on the northeast corner of Cliff and Franfort streets. It also cuts off four buildings on the north side of Vandewater street, and passing on cuts off six more from the east side of Frankfort street. It takes in four buildings on the south side of Rose street, beginning one door from the corner of Frankfort street, and five on the north side of Rose street; six on the south side of William street and four on the north; four on the south side of North William street and five on the north side, and four on Chatham street, beginning four doors from the corner of Frankfort street.

Mr. C. Martin is the assistant engineer in charge of the New York approach, and Mr. T. Collingwood is the engineer in direct charge of the construction of the anchorage.

The Brooklyn anchorage is completed and waiting for the cables and for the completion of the New York tower. Nothing but the cap stones are wanting to the Brooklyn tower, and these will wait the stretching of the cables. The Brooklyn anchorage is in the square bounded by Fulton, Front, Garrison and York streets, and is at present concealed from general observation by the buildings which surround it, and which are to be pulled down as soon as the New York tower is ready for the cables. Cable making will be begun at once on the Brooklyn side. Derricks will be raised on the top of the anchorage, which will be entirely roofed in under a spacious shed, and there this part of the work will be carried on through the fall and winter.

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.

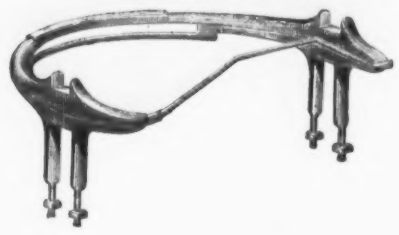


Leaf Pattern.

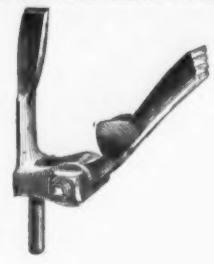
Established 1850.

King Bolt Yokes.

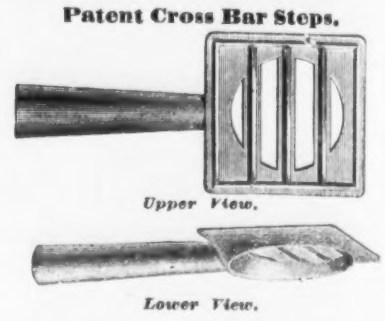
No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.

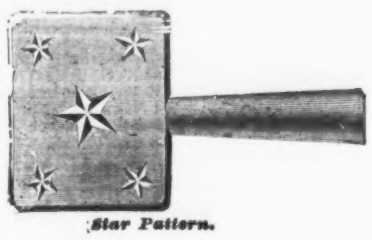


Patent Cross Bar Steps.



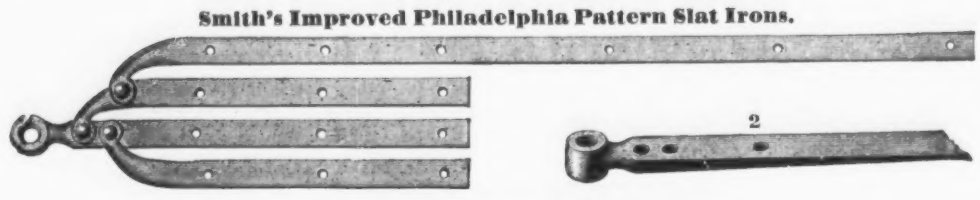
Upper View.

Lower View.

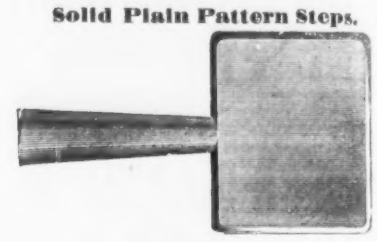


Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



Solid Plain Pattern Steps.



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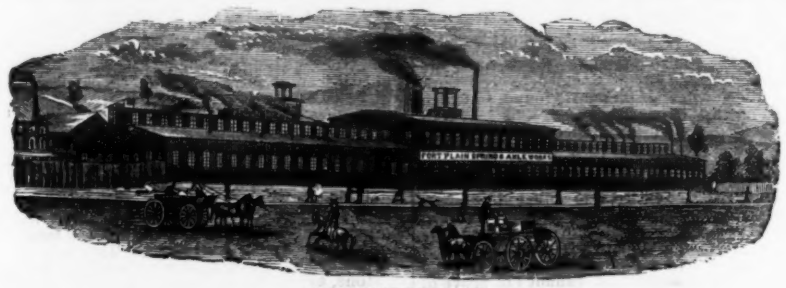

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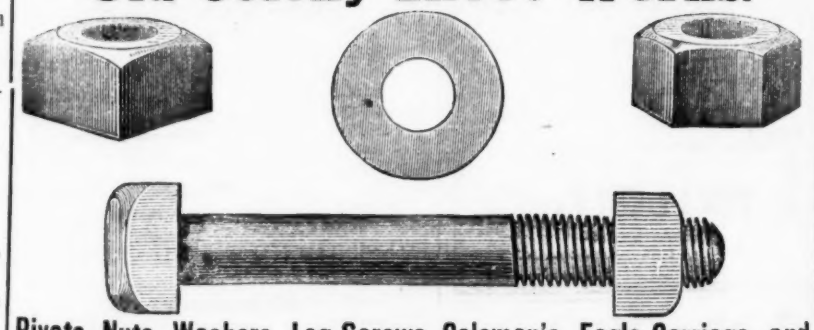

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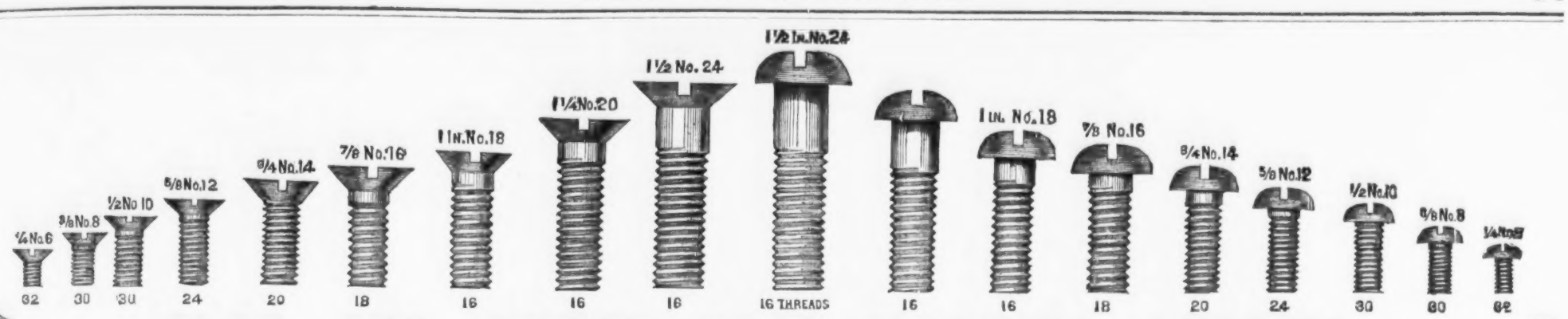

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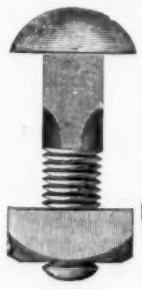

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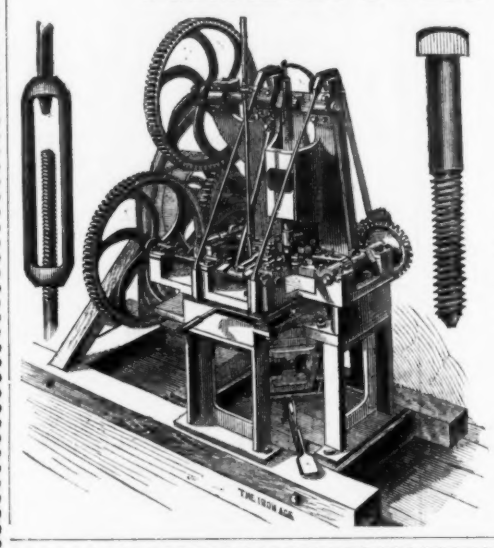

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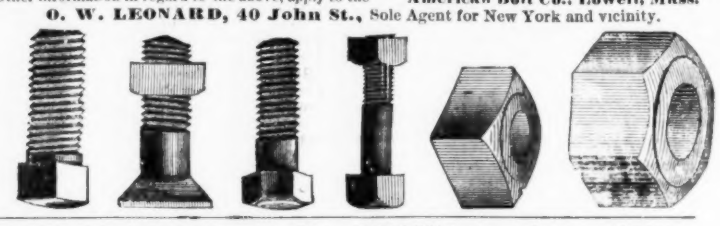

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New York, Thursday, September 23, 1875.

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JAMES C. BAYLES - *Editor.*
JOHN S. KING - - *Business Manager.*

NEW YORK, January 2, 1875.

Until the 1st instant the postage on newspapers was paid by subscribers at the office where the paper was received, the yearly rates on the different editions of *The Iron Age* being as follows: Weekly, 40 cents; Semi-Monthly, 40 cents; Monthly, 24 cents.

Under the provisions of the new postal law, which went into effect on the 1st instant, prepayment at the office of mailing is required, at the rate of two cents per pound for the Weekly, and three cents per pound for the Semi-Monthly and Monthly, which will make the postage as follows on the different editions: Weekly, 50 cents; Semi-Monthly, 30 cents; Monthly, 15 cents.

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CONTENTS.

The Fast Mail Service.

We lately had occasion to allude to long and fast runs made by American trains, as compared with the faster short runs made by English trains, but the first trip of the fast Chicago mail is beyond anything that is upon record in the way of speed and distance covered. The average speed from New York to Chicago, including stoppages, was about 38 miles per hour, the actual running time being 27 hours and 5 minutes. The train left this city at 4:18 on the morning of the 16th, and arrived in Chicago at 6:29 on the morning of the 17th. This extraordinary run was accomplished in six minutes less than the schedule time, notwithstanding the fact that the train was delayed more than half an hour on the road. At Cleveland, Ohio, the train was increased by the addition of two "heavy sleeping cars crowded with passengers." These cars, from all we can learn, were overloaded, and having small axles, there were naturally hot journals, which caused the delay. The postal cars are all fitted with the Master Car Builders' standard axle, and, as was to be expected, gave no trouble. One of the engines had a hot box, which, we presume, was in the truck. The run into Elkhart, from a point near Jonesville, a distance of 71 miles, was made in 71 minutes. In running the last 100 miles the train made up 25 minutes lost time and gained 5 minutes on schedule time. We do not imagine that extra sleeping cars will be again added to this train, unless they are fitted up with the standard axle. The train carried on its second trip 457 pouches of letters and 35,000 copies of the morning papers. There were eight distributing clerks and a chief clerk. The average speed of this train is considerably greater than that of the fast Chicago express, which, until recently, was the fastest train on the continent. We hope those who are anxious for fast trains will be satisfied that we have two daily trains, at least, which equal in speed some of the short English runs over which they have been so much exercised, and which they have wished to see equalled here.

One feature of this fast service must not be overlooked. A Chicago mail train over the Pennsylvania Road started from Jersey City at 4:15, three minutes before the New York Central train left the Grand Central Depot. There has been considerable rivalry between the two lines as to which could make the best time, hence when the delays occurred there was much excitement on the New York Central train. In spite, however, of the time lost it reached Chicago 40 minutes ahead of the Pennsylvania train.

The *Railroad Gazette* makes the following interesting calculations regarding speed:

On the New York Central and Hudson River road the 440 miles from New York to Buffalo are run in 10 hours and 45 minutes, which is at the average rate of 40.93 miles per hour. Excluding stops, the average running time is 43.14 miles per hour, which is good express time in England.

The 559 miles on the Lake Shore road are passed in 16 hours and 20 minutes, which is at the rate of just 33 miles per hour.

The rate of speed is pretty even on the New York Central and Hudson River road, being 41.56 miles per hour from New York to Albany, where the road is almost level and the obstructions by crossings unimportant; while from Albany to Palatine Bridge, 45 miles, on which there is a heavy up-grade, the average speed is about 35 miles per hour; from Palatine Bridge to Syracuse, 92¼ miles, 42 miles per hour; from Syracuse to Rochester, 81 miles, 44.2 miles per hour; and from Rochester to East Buffalo, 69⅛ miles, the speed is a little less than 42 miles an hour—in all cases running time exclusive of stops.

On the Lake Shore road the train westward leaves East Buffalo at 2:35 p. m., Columbus time (equivalent to 2:55 p. m., New York time), and runs 40 miles, to Dunkirk, in 65 minutes, and then makes its first stop. The 48 miles from Dunkirk to Erie are run in 72 minutes—just 40 miles an hour; and the 41 miles from Erie to Ashtabula in 63 minutes. From Ashtabula to Cleveland, 54⅕ miles, requires 85 minutes, and the 113⅓ miles from Cleveland to Toledo are passed in 3 hours and 17 minutes, a stop of two minutes being made at Sandusky. From Toledo to Elkhart, 142 miles, the distance is made in 4 hours and 10 minutes, and from Elkhart to Chicago, 101 miles, in 3 hours and 48 minutes.

The great speed therefore is chiefly on the New York Central, where a journey 440 miles long is made at the rate, including stops, of 41 miles an hour. This is the best time, we think, ever made by a regular train in this country. It is, however, exceeded by some English trains, but usually on much shorter lines. In England in 1872 the Great Northern Railway express made 76 miles at the rate of 47½ miles an hour, but generally express and mail trains run from 35 to 40 miles an hour.

The train on the Great Northern, which made the extraordinary speed above recorded, did not, however, equal the best time of the New York Central train for about the same distance, which traversed 71 miles at the rate of 60 miles an hour. With a straight track, as perfectly kept up as those of the best of English lines, this train would propably have no difficulty in making 80 miles per hour. The rolling stock could stand a much greater speed with safety, were the motive power sufficient; but at a speed above 80 miles per hour, resistances increase so rapidly that the power required is enormous. At 60 miles per hour the resistance of the air is 18 pounds per square foot, and at 80 miles, 32 pounds per square foot. At 100 miles per hour the pressure reaches 50 pounds per square foot. In addition to this resistance of the air, it is found after a certain speed has been reached that the piston speed of the engine is so great that the steam does not follow it fast enough to maintain the power; or, in other words, the engine ceases to work with the same measure of economy that it would at a somewhat lower speed. To get more than 80 miles per hour with an engine drawing a load, the parts would have to be proportioned differently. On the New York Central the platforms of the postal cars are closed at the sides with doors, largely diminishing the resistance of the air, which would otherwise be nearly as great for each car as it is at the front end of the train.

The saving in time to the business community, which this fast mail service to the South and West will effect, is enormous. The use of the telegraph, which in many lines of business has become burdensome, will be diminished, and a large saving be thereby effected. In the matter of fast trains, however, the South and West should not alone be benefited. Boston and New England should have a more rapid mail service. The attempt has frequently been made to run and maintain a very rapid passenger service between New York and Boston, but the great cost, coupled with the fact there was no increased compensation, led to the speedy abandonment of the experiment. It would be possible to run a fast mail train to Boston from this city in 4 hours and 30 minutes, or even less; or, as has been suggested, to make a saving of about 4 hours over the present running time. It is generally supposed that if the roads would co-operate and show a liberal spirit, it could be done. The roads, however, are not alone at fault. There are certain difficulties in the way of making very fast time between the two cities, some of which can be removed while others are due to the nature of the country. To distribute the heaviest mail, the train would probably have to go by way of Springfield. From this place to Boston, the Boston & Albany Road is very crooked with heavy grades for a good portion of the way. The track, however, is in good order, well policed, and the conditions are otherwise favorable for rapid running. On the New Haven line, the road bed is all that could be desired, with the exception of some rather short curves on the main line. In spite of all these difficulties, a mail train could probably be got over the road at the rate of nearly 60 miles per hour, if it were not for the multitude of stops that have to be made. Years ago, after the famous Norwalk disaster, the States of Massachusetts and Connecticut were so insanely frightened lest railroads should every day run trains through open draw-bridges, that they passed acts compelling all trains to come to a full stop at every drawbridge, and also at every railroad crossing at grade. Along the line of the New Haven Road are a very large number of drawbridges, and to come to a full stop at each of them would prevent a train making fast time, unless the speed between was enormously increased. Acts of the legislature particularly directing railroad management are always and in all cases bad. The end could be more surely attained by giving passengers simple, easy and certain recourse in damages against the company in case of accident. So long as the frequent stops at bridges and crossings are required, we fear that Boston cannot have a very fast mail service, and the two States certainly do not deserve it until the oppressive acts are repealed.

The War Ship of the Future.

The sinking of the ponderous British iron-clad Vanguard, by accidental collision with the Iron Duke, adds another to the long list of accidents which have destroyed or rendered useless the great floating fortresses which have lately become the pride of the British navy. These two ships were built after the same model. The Vanguard was a vessel of nearly 4000 tons burden, built by the Lairds, at Birkenhead, and cost about $2,500,000. She was one of the fastest and strongest ships in the British navy, but one blow from the ram of her sister ship, whose bows she tried to cross, cut her open between two compartments, and so disabled her that she sank in an hour. The ease with which her destruction was accomplished, shows how ineffectual is armor plating, as at present applied, to protect a vessel against the dangers to which it is most frequently subjected. Like Achiles, vulnerable in the heel, these ponderous iron batteries are vulnerable below the water line. The experiments lately conducted at Newport with torpedos, showed that these engines of destruction, formerly regarded by naval officers as ingenious but rather inoffensive toys for scientific landsmen to play with, are potent agents in skillful hands, and that no amount of armor plating will serve to protect the leviathans of the line from the vigorous attacks of these naval sword fish. To meet these new conditions we shall probably have an increase of plating, so disposed as to protect the bottom, as well as the sides and deck; while plate must be piled on plate above if the naval architect is to hold his ground in the neck and neck race with the artillerist, who has so far managed to send his projectiles through whatever armor any ship now afloat has succeeded in carrying. In other words, the English naval constructors are going through an experience very similar to that which led to the abandonment of mail and armor for the protection of soldiers against the shafts and arrows of ancient warfare. As long as lances, arrows, swords and battle axes were employed, supplemented later by rude fire arms of short range and little power, armor served a good purpose. With the improvement of the machinery of war, and especially the introduction of better fire arms and more destructive field artillery, armor became worse than useless. It had grown heavier and heavier, but no man could have carried armor enough to make him invulnerable to bullets, and now the soldier is best equipped when equipped most lightly. If we are not much mistaken, the armor plating of vessels will soon be abandoned. Such ships, of small and steadily decreasing value in time of war, are a burden to a nation in time of peace. They are very costly, short lived under the most favorable circumstances, and liable to be rendered obsolete by the introduction of new guns and more formidable projectiles, as well as by the adoption of new models. We think the English nation will grow tired of this kind of investment before very long, and that if we possess our souls in peace for a few years longer, we shall have learned the folly of building great iron ships of war, without having to pay anything for the knowledge.

There are many considerations which lead to the belief that the war vessel of the future will be of very different character from the war vessel of the present time. Probably she will be of iron—possibly of steel—with a double skin, but without armor. She will be light, swift, heavily armed and capable of doing effective service as a ram. No nation will require a great fleet, for the reason that it will have no use for them. When troops are to be moved by sea, transports will be employed, sailing under convoy if protection against hostile vessels is needed. Great navies belong properly to the era of walled cities, fortified harbors and standing armies, and although they have outlived these evidences of early civilization, they have at the same time outlived their usefulness.

Lubrication.

The use of oil in the arts is so general that, at the present day, there are few, if any, mechanical trades that can be carried on without it or its equivalent. Wherever machinery is employed oil must be used to diminish friction. In the use of most of our tools, whether in wood or iron working, a lubricating substance of some kind is needed at times, and in the heavier operations of boring, drilling, and the like, it must be used constantly. In the olden time so little oil was needed, because of the small amount of power used, that it formed but an insignificant item in the cost of manufacturing. It is now often a very important item, and the matter of economy in its use cannot be disregarded. A man who uses two or three gallons of lubricating oil in a year is apt to laugh at the idea of being economical with it, contending that he uses too little to make it an item of cost worth attending to; yet in purchasing he will buy a 25 cent oil, thinking that he has saved perhaps 50 cents or $1 upon the year's supply. If the quantity used is large, there is a constant tendency to economy in the mind of the purchaser, which also takes the form of getting the required number of gallons for the least money. This is often a mistaken economy, and it is commonly bad policy to use the cheaper oil, even though it were to be had gratis; while on the other hand, it might be the best of economy to use oil costing $2 or $3 per gallon. Really, the price per gallon has in most cases but little weight in calculating the expense of lubrication. Even when estimating by the quantity used, the cheap oil will usually be the most expensive, because a much larger quantity is required. Lubrication should diminish friction, prevent wear, and thereby lessen the power needed to perform work. In hand labor an increase of the power needed increases the time consumed, and the less the power used the faster may the work be done. Hence, good lubrication means lessened cost and an increased product. Friction increases the wear, and thus destroys tools; when it is reduced to a minimum, wear is also reduced to a minimum. When one who owns an expensive machine buys a poor oil for the sake of saving a few cents per gallon, he is certainly economizing in his oil bill, but it is at the expense of the machine, which will not only require more power, but at the same time wear out rapidly. As the rule, price should not be taken into account in selecting oil. The consumer should seek the best oil for the purpose, and when he finds it, he will, of course, do well to buy it as cheaply as possible. Oil which has cheapness as its principal recommendation, usually lacks all other qualities to commend it to favor.

It requires no very extensive experience to convince the careful observer that the cheap grades of lubricating oil in the market are little, if any, better than so much soapy water. Most of them appear to be a crude petroleum with a little resin dissolved to give them a body. Rubbed between the fingers they are but little more unctuous than spirits of turpentine. When water is used as a lubricating material, as is sometimes done, the bearings may be kept cool and the machinery seem to work well enough, but it is a well known fact that wear goes on rapidly, and the power required to do the work is increased. With poor oil the case is very similar. A little inattention when poor oil is used is liable to produce serious results, on account of the rapidity with which it works out of bearings, which, when partly dry, heat and cut much more rapidly than they do when a good lubricating material is used. In the latter case the material not only lasts longer in the bearing, but, even when in very small quantities, retains its greasy nature and diminishes friction. The opposite of this seems to be true with a great many oils.

Oils and other lubricants diminish friction by separting the rubbing surfaces, which practically bear upon the thin film of oil between them and slide past each other upon it. Now, whenever the film of oil is so thin that the roughness of one surface strike against those of the other, there is an immediate increase of friction. The kind of oil required depends upon the pressure of the bearing, and the rapidity with which the parts move. If the pressure on a bearing is very heavy, a strong, stiff material, like tallow, soap, plumbago, or even tar, has to be employed, in order that the pressure may not force the material entirely out of the bearing and leave it dry. If the parts are very light, such stiff substances would be manifestly unsuitable. In watches and clocks it is necessary to use the most limpid of oils, and yet even with such light work a certain amount of body is needed to prevent the oil from flowing from the bearing by its own weight. The poorer and cheaper oils are generally of such a character that they do not form a film of any considerable body in the bearing, and hence the parts are constantly liable to come in contact and so begin heating. In all cases the oil must suit the work, or there will be wear and waste of some sort. For ordinary machinery sperm oil is commonly considered best, but at the present time this cannot be obtained pure, and lard oil is probably very nearly equal to it. Lard oil seems to be the best general lubricating oil in the market. When the bearings are of such a form that a little tallow can be used in connection with it, the result will be improved. This oil will cost more than the cheap petroleum lubricating oils, but it is worth more than the difference in price. Where bearings have heavier pressures upon them, tallow can be used to advantage with a very little oil. No oil is fit for lubricating purposes that will gum or harden by exposure to the air after the manner of linseed oil. Many oils which would otherwise be admirable on machinery are thus excluded from this use.

Oil cups are now largely used upon all parts of machines of any size and on long line shafting. There is a very common idea that filling these oil cups once a month is all that is needed, and any boy is supposed to be able to perform this work properly. Oiling is too important a matter, however, to be trusted to any one but an intelligent and experienced mechanic. As an example of the troubles which a boy's ignorance and a foreman's indifference may occasion, we recall an incident that happened under our own observation. On the wall of a building opposite our office window was a line of shafting used for transmitting power to a neighboring building. It was furnished with the usual glass oil cups, which were replenished by one of the boys about once a month. One of the cups leaked, however, so that the bearing had oil for only about half the time. We called attention to the fact that the bearing was dry about half of the time, but it received no better care. After a couple of months the bearing got hot and began to make so much noise as to disturb the whole neighborhood. The matter had then become so serious that the machinery had to be stopped and a great attempt made to stop the noise. At last the bearing had to come down, another was put up without improvement, and in the end a new hanger had to be put up a foot or two away. The shop lost four or five days, and the expense was heavy. Here was a case where an important matter was left to a boy's inexperienced judgment, and much evil resulted. The foreman was to be blamed doubly, for beside the carelessness, the oil was so poor and cheap that it was practically worthless. When rubbed between the fingers it had very little of the greasiness characteristic of a good lubricating material. The trouble with this one bearing cost many times more than a year's oil bill. Had lard oil been used the result would not have been nearly as disastrous.

The point at which we must begin to practice economy in lubricating materials is in the application of the oils to the bearings. Men too often take the oil can and squirt at the oil hole; if a gill or two runs down the side of the bearing no matter—it is all right if some of it reaches its desti-

nation, and the surplus can be wiped off with a bunch of cotton waste. Commonly too much oil is poured into a bearing till it runs out somewhere; a drop or two would probably answer just as well. In line shafting where drip pans are used, the pan is generally well filled with oil that never went through the bearing. In applying oil to machinery both boys and men seem to think that if a little is good more is better, and they act accordingly. The machine is flooded with oil, and is covered with "gurry" all over. It is safe to say that in the run of shops, not more than half of the oil used does any real service.

Tallow, plumbago and grease of various kinds can often be substituted for oil with advantage. In the large screw making establishments soapy compounds are substituted for oil in cutting threads. When an oil lacks body, tallow can often be added to it with advantage. Glycerine may be made to take the place of oil on oil stones, which are often ruined by the use of kerosene or some other coal oil product on them. Glycerine is much neater and vastly better than the common oils, and, so far as our own experience goes, is the best substance for oil stones that we have tried.

Foreign Trade via the Mississippi.

An effort is now making to establish a direct foreign trade for the principal cities of the West, which seems to give promise of success. The Mississippi Valley and Brazil Steamship Company, lately organized at St. Louis and incorporated under the laws of the State of Missouri, is the pioneer enterprise in this direction, and it is intended that the service shall begin by the sailing of the first vessel on or about the 1st of November next. The incorporators of the company are Capt. J. B. Eads, of St. Louis, prominently known in connection with the St. Louis bridge and the improvement of the mouth of the Mississippi; Hon. Thomas Allen, president of the Iron Mountain Railroad Company; Mr. Charles P. Chouteau, and others. The service will be between New Orleans and Rio Janeiro. Much interest is felt in the success of the line by the merchants and manufacturers of the Mississippi Valley, and the first ship will carry out a well assorted cargo, selected with a view to determining the lines of trade most likely to be profitable. It is expected that the principal requirements of the South American markets will be agricultural produce, bar and ornamental manufactured iron, steel, lead, shot, hardware, glassware, cutlery, shovels, tools, hollowware, housefurnishing goods, paints, lumber, furniture, canned goods, lamps, kerosene, stoves, and many other articles largely manufactured in the West. Return cargoes are expected to consist principally of coffee, drugs, wool, dye and cabinet woods, India rubber, hides, cocoa, spices, sugars, etc., all of which should find a ready market in the West. The venture is certainly in the right direction, and we wish it every success. The near-by markets of the South American continent offer an inviting field for American enterprise, and there seems to be no reason why the West should not succeed in establishing a direct trade with these markets. Brazil annually consumes a million barrels of imported flour, and the Valley of the Mississippi annually consumes a million bags of imported coffee. The only reason why this exchange should be effected indirectly is the lack of commercial enterprise in the West. Should this venture succeed it is to be hoped that others will follow. A direct export trade would do much to stimulate the development of manufactures in the West, and by so doing greatly promote the prosperity of the whole country.

The cable reports the failure of another of the great British iron works. This time it is the Richmond Iron Works, at Stockton-upon-Tees; a large establishment with 26 furnaces and roll capacity in proportion. The iron trade seems just now to be the weak point in the British industrial system. The loss of foreign trade, the decline in prices from the figures which so enormously stimulated production in 1872, and the proportionate increase in the cost of production due to the successful efforts of the labor unions to advance wages, have brought about the present troubles. As there seems to be little to encourage the hope of an immediate improvement in the export demand, and none at all of a recovery of trade with the United States in rails, merchant bar, and manufactures of iron, it will probably be necessary for the British iron masters to limit their production for a long time to come. Unfortunately, the situation in this country is not so much better as to afford us any cause for congratulation. We have, however, been more fortunate than our English neighbors in having fewer important failures in the iron trade.

New Publications.

THE INTERNATIONAL GUIDE TO BRITISH AND FOREIGN MERCHANTS AND MANUFACTURERS. 1875. London and New York: Published by Ingoldby & Lamb.

This is the largest, and in some respects the best, work of its kind which has come under our notice. It is of octavo size, containing nearly 1400 closely printed pages, with a voluminous index in English, French, German and Spanish. The divisions of the work are further marked by the coloring on the edge, which enables the user to turn to whichever department he may wish to consult. We are informed that great pains have been taken in the work of compilation to insure completeness and accuracy, and that only sound houses of leading reputation have been catalogued. The scope of the work is sufficiently indicated by its title. Mr. H. F. Bezant, No. 81 Nassau street, is the agent for the work in this country.

NATIONAL SELF PROTECTION. By Joseph Wharton. Philadelphia: Published by the American Iron and Steel Association. 1875.

We have in this little pamphlet a convenient republication of an essay originally printed in the *Atlantic Monthly*. The author, Mr. Joseph Wharton, is a gentleman well and favorably known to the iron and metal trades, and is one of the vice-presidents of the American Iron and Steel Association. His essay is a calm, logical consideration of the question of protection to native industry under a tariff imposed for that specific purpose, and shows not only a perfect understanding of the question as viewed from the standpoint of an American manufacturer, but a thorough acquaintance with both sides of the argument, and an extensive reading of the standard and current literature of political economy. We do not expect that the thick-and-thin advocates of free trade will accept Mr. Wharton's conclusions, since they cannot, or will not, accept his premises; but even those who disbelieve in protection as a system must admit that this is one of the most logical presentations of its claims to public favor ever made. It will be searched in vain for stock arguments, shibboleths and cant phrases, so commonly found in the writings of less intelligent students of the advantages of protection in stimulating the national development and promoting the national welfare. Its usefulness will be in furnishing new material for reflection to thoughtful persons into whose hands it will pass. In addition to its other merits it is interesting, which is more than can be said of most essays on economic questions. Mr. Wharton has a peculiarly smooth and happy style, and seems to have a natural aversion to platitudes. We hope his contributions to our current literature will be frequent, and that all will prove of equal interest and value with this one.

ANNUAL ANNOUNCEMENT OF THE STEVENS INSTITUTE OF TECHNOLOGY, &c. 1875.

In this annual announcement we find matter of much interest, including an illustrated description of the institute buildings, and descriptions with illustrations of the more important and valuable apparatus in the several departments. The course of instruction, published for the information of those interested, shows the scope and thoroughness of the system of technical instruction adopted at this excellent college, which we can say with confidence graduates no second-rate scholars and gives no unearned degrees. Its faculty is well chosen, and gives the Institute a corps of instructors of exceptional strength. Since its organization the Stevens Institute has taken rank among the best technical schools of the time, and while it neither seeks nor depends upon the patronage of the public, those who can secure the privilege of scholarship in it are, we think, more fortunate than those who seek such facilities abroad. The great merit of the Stevens Institute course of instruction is that it teaches the student something which he can make immediate and profitable use of. The graduate who cannot make his way in the world from the day he leaves the college has, we think, only himself to blame.

The Argand Base Burner Suits.

To the Editor of the Metal Worker: I am sorry to be compelled to advert to a recent communication published in one of your late issues, over the signature of Perry & Co. There are always two sides to a story.

There never has been, to my knowledge, any combination of "seventeen powerful firms," formed for the purpose of contesting the right of Perry & Co. to their own inventions. Neither would the "combination" to which that firm refer lift a finger to prevent their receiving any patent to which Perry & Co. might be justly entitled.

After a long and exhaustive examination, and arguments, the patent office authorities decided the case between Carter & Dwyer on one side and Perry & Dickey on the other.

1st. That Carter & Dwyer were not the first joint inventors.

2d. That Perry & Dickey were not the first joint inventors.

The sequence is that no patent can issue to either of the contesting parties.

It is unusual for parties to appeal from a favorable decision. Perry & Dickey appealed from this decision in August.

When the patent law is amended to grant patents to second inventor, then Perry & Dickey may obtain one—not before. They seem to like newspaper notoriety, to which they are welcome. We shall not follow them, neither shall we resort to technicalities or quibbles; such, all through the case, have been the weapons upon which that firm have relied.

THOS. S. SPRAGUE,
Attorney for Carter & Dwyer and their Assigns.
ALBANY, Sept. 14, 1875.

Scientific and Technical Notes.

The enterprising little European republic, nestled among the Alps, has much to be proud of in the way of great and successful public undertakings.

THE ENGINEERING WORKS OF SWITZERLAND are quite as wonderful as, and in some respects more interesting than, those of any other country on the Continent.

There is, first of all, the Mount St. Gothard—or rather that gigantic range of several mountain tops—where a Swiss engineer, M. L. Favre, of Geneva, is now piercing the greatest railway tunnel ever built (9½ miles), and it is expected that it will be accomplished within three years. Next we have the now well known Regi Railway, with inclines of 1 in 4; and a second Rigi line, as well as a short link between the hotels, situated on the top of that celebrated mountain, have been opened last May. But the most interesting tourist railway to be seen in Switzerland runs from Zurich upon the Uto Mountain, a line which has gradients of 70 per 1000, or of 1 in 14⅓, combined with curves of 130 meters radius, worked by the adhesion of small tank engines. The pneumatic railway from the port of Ouchy, on Lake Geneva, to Lausanne, will soon be opened, and we have yet to notice the great bridges near Fribourg, that recently erected by the Northeastern Co. at Brugg, and those on the Swiss National Railway over the Thur and the Rhine, also the railway ferries on Lake Bodan. The civil engineer who visits Switzerland will specially be interested by the Rhine improvement works in the Canton of St. Gall and by the correction of the Jura waters; he should, however, visit above all the great water power works at Schaffhouse and at Fribourg, where hundreds of horse powers are obtained by big turbines and then transferred by wire rope transmission to all parts of the towns to supply local industries with cheap motive power. In a like manner the great power of the waters of the River Aare, passing by the Swiss capital, Bern, will soon be turned to useful account; but here the parcelling of the power will take place by means of pneumatic transmission, no doubt the cheapest and handiest mode of subdividing power to any desired amount and distance, as the water pipes can be laid and kept in repair with far less trouble than the wire ropes above mentioned. Our mechanical engineers will also remember the large engineering establishments of Escher, Wyss & Co., of Sulzer & Brothers, and of Ricter & Co., and to these has recently been added a locomotive factory, capable of building annually 50 first class engines.

From advance sheets of the *National Car Builder*, for October, we have the following particulars in relation to the

FAST MAIL POSTAL CARS

on the New York Central. They were built at the shops of the New York Central and Lake Shore roads, and consist of three styles or classes, one for assorting and distributing newspapers, another for letters, and a third, called tenders, for stowing through mail matter. The one for newspaper service is 60 feet in length, 9 ft. 8 in. wide outside of sills, and is mounted on six wheel trucks. The outside, below the letter boards, is painted almost a pure white, the letter boards being a shade darker. In the center is a large oval raised panel bearing the name "Gov. Tilden," and on either side toward the ends, is a shield, one representing the national coat of arms, and the other a design with the Latin inscription, "Novus Ordo Seclorum." The letter car is 50 feet long and runs on four wheel trucks. Each car is lettered "The Fast Mail," and also with the names of the two roads, N. Y. Central and Lake Shore. There are two double doors on each side, and also two of Ward's mail-catchers for receiving mail bags at the various points without stopping the speed of the train. The interior of the "Gov. Tilden" is fitted up with all the necessary facilities for assorting newspaper mail matter. These consist mainly of 94 chutes to which the bags are attached. The letter distributing car is fitted up with 946 letter boxes. The platforms are inclosed with side doors so that there is communication from one car to the other with but little exposure to the wind and weather. The lighting is by student lamps. The letter distributing car is named "Gov. Dix," and has the same ornamental features and general outside appearance as the "Gov. Tilden." The tender cars, to which we have referred, are all 50 feet long, and painted pure white, except the frezes, which are a trifle darker. They also have four wheel trucks. There are no inside fixtures except a double row of stanchions extending from floor to roof, and six candle burners suspended from center of dome. The side lights are wider than usual, and are continuous, without division panels, for the purpose of admitting as much light as possible.

Considerable interest has lately been excited in England by the performances on a railroad near Bristol of a locomotive designed to facilitate the operation of

PASSING TRAINS OVER STEEP GRADIENTS.

The following is a brief description of the engine and its operation: "The locomotive engine is coupled to the train by a steel chain or steel wire rope, which is wound round a drum mounted in the framing of the engine. The axis or shaft of this drum works horizontally in bearings fixed in the main framing of the engine, and is rotated direct, or with more advantage, by gearing, from a separate pair of cylinders distinct from the usual cylinders which drive the locomotive. On each side of the engine framing, and also on each side of the carriages or wagons in the train, are suspended self-acting gripping struts, which, when let down on the rails by the driver of the train, will grip the sides of the rails and hold the engine and train stationary. On arriving at the foot of an incline, the engineer releases the hauling drum and runs it up the gradient to any desired distance. The driver then releases the struts, they come into contact with the rails, and on the engine being stopped, and attempting the least retrograde movement, they grasp the rails and maintain the engine in its place. The hauling drum is now started, and the chain draws the train up close to the engine. The struts on the train now come into action and firmly hold the train in its place. The operation will be continued until the whole of the gradient has been surmounted. The advantages claimed for the invention are, briefly: On level sections and comparatively light gradients, the locomotive acts precisely as an ordinary locomotive; it facilitates the hauling of heavy trains by light locomotives round sharp curves, and it will, roughly estimated, save seven-eighths the cost of construction of lines in rough countries, as in many cases it will obviate the making of tunnels, and it will lead to the employment of lighter locomotives." This plan is a novel one, and has its points of value, though certainly it does not have as wide a range of action as the inventor claims for it. The system can probably be applied with advantage on parts of mountain lines, and in similar places. But the waste of time and the wear and tear will prevent its adoption for general traffic. In many cases a pushing engine to help trains over steep gradients will be preferable. As the engine is of necessity a double one, having a pair of separate cylinders for driving the winding drum, the wear and tear and the repair bills will be largely increased, possibly doubled. In a great many cases this would equal the running expenses of another locomotive.

We have lately received from the National Tube Works, of Boston, Mass., and McKeesport, Pa., samples of a new

ENAMELED IRON PIPE,

which seems to meet every requirement for a cheap, safe and durable water pipe. In connection with water service, the two points of greatest consequence are the best kind of pipe for main conduits and the most desirable pipe to supply water for domestic purposes. The practice in general use is to have one large main with diameter sufficient to supply all the tributary ramifications, made usually of a very low grade of cast iron, very brittle, very heavy, difficult to make perfect joints, and, consequently, very liable to serious leakage, particularly when laid on marshy, sandy and shifting soils. This pipe is usually coated with a preparation of tar to prevent rust. The many imperfections of this class of pipe have led some cities to adopt wrought iron riveted of the same size, the only drawback to this being the multitude of rivets, every one of which is a center for corrosion and consequent tendency to leakage. It has been found by experience, however, that depending entirely on a single main, of whatever material, is dangerous; whole cities, both in this country and in Europe, have not unfrequently been left without water in some of their districts, owing to the bursting or other derangement at some point of this large main. This has led to the adoption of two or three smaller mains, generally 12 to 14 inches in diameter. These smaller mains can now be had of seamless lap welded wrought iron in long lengths, put together with patent joints, without rivet or seam; they are of great durability, capable of sustaining immense pressure; can be carried over rivers, treacherous ground, gulches and ravines; are of less weight, laid much quicker, and at a great saving of cost; are covered with an indestructible coating of enamel, which no acids, sulphur, lime or salts, of any kind, can remove, and their actual cost, all things considered, is about the same as that of those now in use.

The insoluble enamel of the iron pipe made by the National Tube Works is its great feature. Plain cast and wrought iron will rust and corrode. Iron lined with cement is full of imperfections. Iron lined with porcelain or glass would be a good conduit, but is found impracticable from its brittle, unbending unelastic nature. Galvanized iron, which, on its discovery, bid fair to solve the problem, is found seriously wanting, particularly where iron, lime, sulphur or alkalies form any part of the ingredients in the water. The new enamel, the composition of which is understood to be a secret, seems to be just what is wanted. It is elastic, hard, insoluble in water and resists the action of acids, alcohol, alkalies, sulphur salts of all kinds and heat, and experimental tests of the most severe kind have thus far failed to dissolve or remove it. Prof. Otto Worth, of Pittsburgh, and Prof. S. Dana Hayes, State assayor and chemist, of Massachusetts, both affirm that it has stood the severest tests to which they could subject it, and both recommend it as safe and sanitary. Whether it will stand the test of long usage we cannot say. We believe it is a comparatively new article of manufacture, but it gives every promise of durability and usefulness. We have records of two or three years service under unfavorable conditions, which are perfectly satisfactory.

A French journal, in a note on the

WEAR OF STEEL RAILS,

expresses the belief that "the chief advantage which results from their use, as compared with those of iron, is that the wear caused by friction is even, being parallel with the length, and takes place slowly, whereas the best iron rails deteriorate under the influence of the traffic, and are found to be for the most part unfit for use before they have lost any appreciable portion of their weight by even wear. In this connection, mention is made of the experiments instituted by the great Northern Railway Company on iron rails from all sources, and which have demonstrated that the best samples, upon their system, have not withstood a traffic of more than 20,000,000 tons, and that for those of ordinary quality this figure does not exceed fourteen millions. Now, in the case of steel rails, it is claimed that all the trials proved that the table of the rail wears uniformly, at the rate of one millimeter for every 20,000,000 tons passing over it; and as the rails are got out with a view to their losing ten millimeters by wear, it can, of course, be estimated that they will endure a traffic of at least 200,000,000 tons—that is to say, that the endurance of the steel rails is more than ten times that of the iron. This being the case, it is claimed that the substitution of steel rails for those of iron effects a great reduction in the cost of maintenance, at the same time that it insures a more even strength to the permanent way, and increases, in a high degree, the safety of working, which considerations, of course, are of paramount importance."

The opinion in this country is that the iron rails laminate because the loads are greater per square inch than the metal can bear, consequently the surface is crushed and its cohesion destroyed. Some statistics which have been published within a comparatively short time show that where the maximum weight per wheel was so small that the weight per square inch did not exceed the strength of the iron to resist crushing, the life of the iron rail approached that of steel. Where the iron of the head of the rail has been made exceedingly hard, the life of the rail, even under a very heavy load, has been nearly as great as that of steel, if not quite equal to it. The superiority, therefore, of the steel, aside from its greater strength, seems to be in the greater hardness of the material.

The British Board of Trade has lately published a summary of the

RAILWAY STATISTICS OF THE UNITED KINGDOM

for the past twenty years, which presents some very interesting totals and comparisons. In 1854 there were in the United Kingdom 8053 miles of railway open for traffic, and at the end of 1874 there were 16,449 miles, or more than double the former number. The increase has been greatest in "single lines;" these increased from 1950 miles in 1854 to 7700 miles in 1874; but the lines which are double or more advanced only from 6103 to 8749 miles. The capital paid up has more than doubled in the twenty years, having increased from £286,068,794 in 1854 to £609,895,931 in 1874; so that throughout the twenty years we sank or spent above 16 million sterling per annum, on an average, in making railways in the United Kingdom. The ordinary stock has only risen from £166,030,806 in 1854 to £248,528,241 in 1874, the increase of capital having been chiefly in that which has a fixed rate of interest. Thus the guaranteed and preferential stock has increased from £49,377,952 in 1854 to £200,930,629 in 1874, or fourfold; and though the "loans" or floating debts show a decline from £70,660,036 in 1854 to £49,266,070 in 1874, the perpetual "debenture stock," which has come into such favor, amounted in 1874 to no less than £111,170,991, increasing from less than 16 millions in 1867 to seven times that amount in 1874. The number of ordinary passengers conveyed by railways (that is, the number of journeys made) has increased from 111,180,165 in 1854 to 477,840,411 in 1874; but this is exclusive of the journeys of season or periodical ticket holders, who in 1874 were 493,957, or nearly half a million in number. No account is given, nor any estimate, of the number of times these last traveled. In 1874 they paid in all £1,069,181 (not a twentieth part of the whole receipts from passengers), averaging about 43/3 from each season or periodical ticket holder. The Great Eastern had the largest number—172,064, chiefly workmen, and they paid only £74,431 in the whole; the North London came next, with 54,563, paying £25,556. The Brighton line had only 10,974, but they paid £117,811. Without estimates from the companies as to the number of journeys under periodical tickets, we cannot tell how many are the travelers (journeys) by railway in this kingdom in a year. The receipts from passenger traffic and from goods traffic were not very far from equal in 1854; but there has since been a change, and in 1874 the passenger receipts, which in 1854 constituted the larger sum of the two, were to be goods receipts as only 42 to 54. The receipts from traffic have risen from £20,215,724 in 1854 to £56,899,498 in 1874, or adding rents, tolls, navigation, &c., £59,255,715. The working expenditure constituted but 47 per cent. on the receipts in 1860, and was the same in 1871; but prices have risen, and in 1872 the expenses reached 49 per cent.; in 1873, 53 per cent.; and in 1874 they were 55 per cent. Still, the net receipts which were but 4·19 per cent. on the paid up capital in 1860, reached 4·37 per cent. in 1874. The recent rise in prices has materially affected the cost of construction and working of railways. In 1854 the paid-up capital was equal to £35,523 per mile of line open; in 1872 the amount was little more—namely, £35,984; but in 1873 it had become £36,574, and in 1874 it was £37,078. In the year 1874 the gross receipts of the railway companies of the United Kingdom amounted to nearly 60 millions sterling, and the net receipts exceeded half a million a week. The passenger trains traveled nearly 97 million miles in the year, and the goods and mineral trains traveled above 100 million miles.

The wire suspension bridge over the Ohio River, at Cincinnati, is, with one exception, the largest bridge of its kind ever built. From tower to tower is 1057 feet, while the entire length of the structure is nearly 2360 feet. It is suspended by two immense wire cables 100 feet above water level. Its weight is 600 tons, but it is estimated that it would require a pressure of 16,000 tons to bend it from its position. The building of the bridge taxed the faith and patience of the city for years, and swallowed up the immense sum of $2,000,000 before it was completed, but now that it is a fact accomplished the Cincinnatians look upon it with a pride which is truly pardonable.

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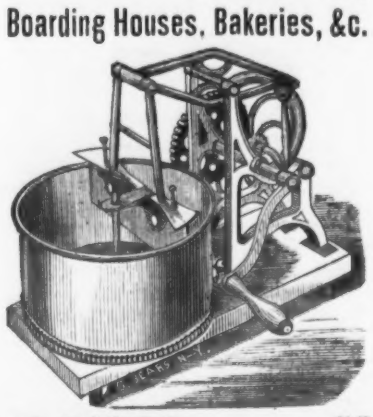

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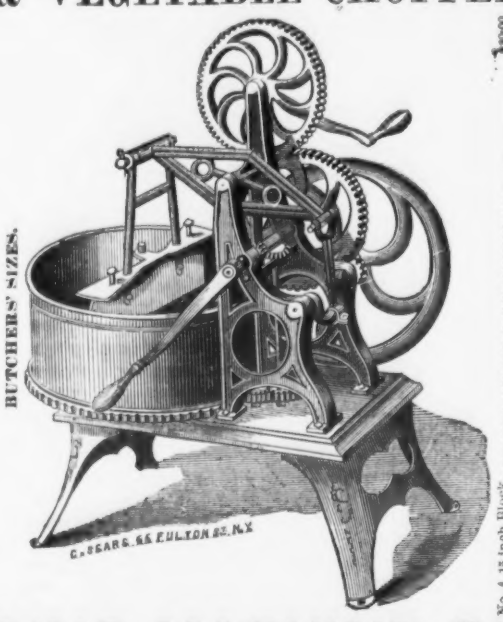

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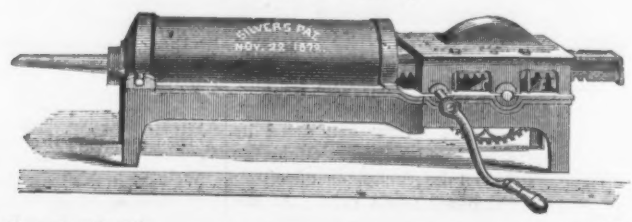

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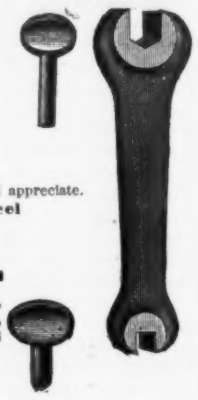

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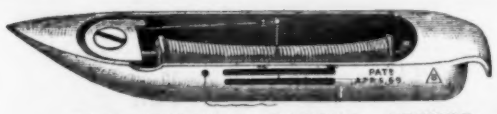

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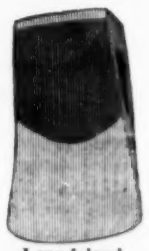

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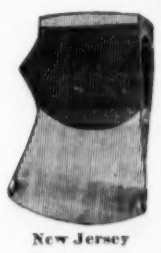

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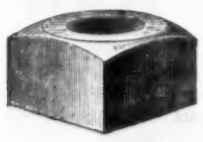

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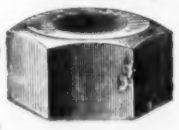

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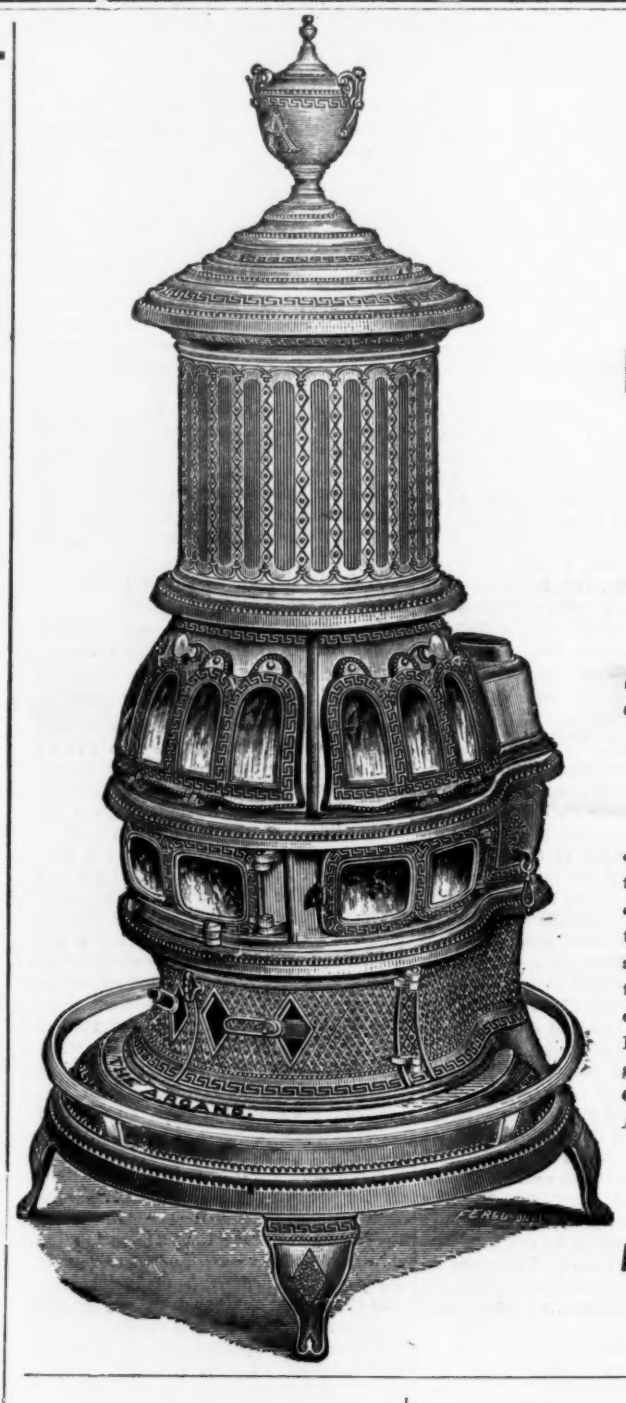

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The Artesian Well at the Philadelphia Mint.

For many years past there has been considerable difficulty experienced at the Philadelphia mint during the summer seasons on account of a short supply of water, and in order to guard against this difficulty in future an artesian well is now being bored in the yard at the back end of the building, and has already reached the depth of nearly 500 feet from the surface. The well was commenced early in July, when a cast iron pipe, 12 inches in diameter, was first driven through 6 feet of surface soil, 16 feet of brick clay and 31 feet of coarse gravel, 53 feet in all, to the solid gneiss rock. The pipe was driven firmly into the rock, thus shutting off all surface water, or any loose soil that might cave in. The drilling was then commenced in the gneiss rock, the hole being eight inches in diameter.

The gneiss was found to be 330 feet thick, after which the tools struck the hornblende rock of a dark lead color, through which they are now boring. Here and there very soft streaks are found in the hornblende, but as a general thing it is very hard. Sixty-two feet of this rock has been penetrated so far. At a depth of 310 feet the well was tested, and found to be capable of yielding 30 gallons of water per minute constantly, but as this is a work which is to last for years, it was decided to keep on boring until a much larger supply was reached, so that there may be no possibility of failure in the future.

On the morning of Friday, August 13th, a the depth of 373 feet, the tools broke in the well, causing a delay of several days before the broken portion could be recovered and the boring proceed. The tools were finally grappled for and recovered, since which no accidents have happened.

A description of the tools and the manner of boring an artesian well will be interesting to many readers. The tool with which the boring is done is of iron, 40 feet in length, 4 inches in thickness and weighing 2000 pounds. This is suspended by a cable, 2½ inches in thickness, and of a sufficient length to pay out as the well increases in depth.

An ordinary "walking beam" of wood, which is driven by a portable steam engine rises and falls continually over the mouth of the well; the cable which suspends the tools passes from a drum over the end of the walking beam, thus lifting the tool and allowing it to drop with measured strokes on the rock, which is thus gradually drilled out. A workman sits at the mouth of the well, having the cable grasped in a sort of tongs, and at every stroke he gives the rope a twist so as to turn the chisel which is working in the bottom, and keep the hole circular in shape. The tool, as before stated, is 40 feet in length and consists of six parts screwed together. At the top is the "rope socket" four feet long; this is hollow, and the end of the cable is inserted and bolted into it.

The next section is called the "sinker bar," and is a simple iron bar eight feet long. Then come the "jars," which are 7 feet long. These "jars" are merely two long links like those of a chain, one working in the other, and are intended to increase the force of the blow upon the rock by allowing the upper portion of the tool to fall violently upon the lower portion after the chisel shall have reached the bottom.

The next section is the "auger stem," 18 feet long, and at the lower end is the "drill," three feet long, shaped like a chisel, and made of the finest quality of steel. This drill is constantly rising and falling upon the rock with a force caused by the weight of a whole ton of iron and so much of the cable as may be payed out in the well.

The break in the tools in use at the Mint occurred in the upper link of the "jars," which broke square off, and fell directly across the bore. The piece which was about one foot long and six inches wide, became jammed between the tools and the side of the well. It then became necessary to put in what is called a "spear," which is simply a chisel with the point turning outward toward the side. By working for several days with the "spear," the whole was sufficiently enlarged to allow the small piece to drop to the bottom. A heavy hook was then attached to the cable and lowered to the tools, and after considerable working it was caught in the lower link of the "jar," and the broken tools lifted to the surface.

A duplicate set of tools being at hand, was at once introduced and the work of drilling proceeded with. Accidents by breaking the tools are frequent in boring artesian wells, as the very best iron that can be procured will granulate in time from the constant percussion. There is not often so much difficulty, however, in recovering the tools, in this case the small broken piece being a serious impediment. Had it not been for this the broken tool could have been removed at once by the "alligator tongue," an instrument on the shear principle, which is lowered and seizes the end of the broken tool, when the harder it is pulled from above the tighter it holds on to the object below.

While the well is in proces of boring, the tools are frequently removed, and the sand pump introduced to remove the matter from the bottom, which is done by means of a suction valve. The same pump removes all the ground rock, gravel, &c., taking up at times stones an inch or more in diameter. After the well is sunk to the required depth, a pump tube is sunk in it to within a few feet of the bottom. In an 8 inch well this tube is 5 inches in diameter, and the space between the lower end of the tube and the rock side of the well is packed with a "seed bag," which is a leather bag containing flax-seed. This packs very solidly, and prevents the surface water from dripping to the bottom, and secures the presence of only the pure water from the deep spring.

The water from below then rises in the pump tube by its natural force to within a few feet of the surface of the earth from whence it is pumped into the tanks built to receive it. At the Mint two large iron tanks, capable of holding 20,000 gallons each, have been constructed at a level with the roof of the building. These tanks are connected together by a 4 inch pipe, and the water will be pumped to them through a 4 inch pipe from the well.

A neat marble building, similar in style to the main building, will be erected for a pump house, and an equalizing pumping engine of 10 horse-power will be used to raise the water to the tank. The contractors for the whole work are Messrs. Melvin & McMorris, of Philadelphia, who have already sunk a large number of these wells, in various portions of the country, the most important in that vicinity being the following: Bergner & Ennell's brewery, a well 576 feet deep, now yielding 143 gallons of water per minute; Fielding L. Williams & Co.'s sugar refinery, a well 204 feet deep, yielding 150 gallons per minute; Smith's Island, a well 206 feet deep, yielding 50 gallons per minute, but which is not pumped to its full capacity; Powers & Weightman's chemical works, a well 250 feet deep, yielding 150 gallons per minute; Continental Hotel, a well 202 feet deep, yielding 100 gallons per minute; Flat Rock paper mills, a well 600 feet deep, yielding 80 gallons per minute; Pascal iron works, a well 400 feet deep, yielding 150 gallons per minute; Mc Kean, Newall & Borie's Sugar Refinery, three wells, 186, 254 and 269 feet deep respectively, yielding an average of 100 gallons per minute each; Hance Brothers & White's Chemical Works, one well 130 feet deep, yielding 40 gallons per minute; Jessup & Moore's Paper Mills, Wilmington, Del., one well 300 feet deep, yielding 40 gallons per minute; W. H. Wilson's residence, Bryn Mawr, Montgomery county, one well 400 feet deep, yielding 200 gallons per minute; Conyers Button's Hosiery Mills, Germantown, one well 300 feet deep, yielding 75 gallons per minute; Nixon & Stokes, Twenty-fourth and Vine, one well 304 feet deep, yielding 250 gallons per minute; Col. Thos. A. Scott's residence, Darby Creek, one well 50 feet deep, yielding 60 gallons per minute. The temperature of the water obtained from these wells is uniform the year round at from 46° to 52°, while the average temperature of the Schuylkill in summer is from 80° to 90°. The well water also contains much less solid matter, and is said to be very economical for use in boilers, as it does not form scales nearly so fast as the river water, and, therefore, consumes less fuel in the generation of steam.—*Ledger.*

Proposal to Federate British Trades Unions.

The trades' unions in Great Britain appear to be somewhat keenly alive to the fact that their influence is diminishing, and that, no matter how favorably they may be regarded in times of prosperity, the men look upon them with a sour and jealous feeling, when wages are descending and employment scarce. The Amalgamated Association of Miners, formed some years back by Mr. Halliday, and numbering some 110,000 members, has collapsed entirely, but its members will all be asked and urged to join the new National Miners' Union, which will embrace all the miners in the country if the scheme can be carried out. The Parliamentary Committee of the National Federation of Trades have just issued a manifesto to the officers and members of the various trade societies of the United Kingdom. As it is of special interest we subjoin it in full:

"GENTLEMEN.—In presenting for your consideration a proposed code of rules for the government of a federation of organized trade societies, we consider it necessary that we should explain the circumstances which have induced us to take the initiative in this matter. Recent events clearly indicate that the employers have recognized the weakness of their position, and have determined on the promotion of large and powerful organizations of mutual protection and assistance. Whilst their cry through the public press is 'peace!' 'peace!' their actions show that they are actively preparing for war. Assurance companies are being formed to subsidize capitalists in their contest with their workmen, and before long some particular trade will probably be selected as the object of attack, the employers in the trade being supported by the united strength of the federation in an attempt to destroy the unions existing among the men. At the Trades' Union Congress held at Sheffield in January, 1874, the representatives of several important societies met to consider the subject of federation, and agreed on a course of action to be pursued. Circumstances, however, which subsequently arose, prevented for a time the practical realization of the wishes and intentions expressed at the meeting. During the autumn of 1874, the councils of the Amalgamated Society of Carpenters, the Joiners, the Amalgamated Ironworkers' Association, and the Boilermakers' and Iron Shipbuilders' Society, being of opinion that some steps should be taken with a view of federating the various trade societies in the iron and building trades, instructed their general secretaries to conjointly issue an address calling attention to the importance of this question, and inviting societies interested in the movement to instruct their representatives to attend a meeting to be held during the sitting of the Liverpool Trades' Union Congress. A meeting of representatives of various societies in the iron and building trades was accordingly held at Liverpool, under the presidency of Mr. Daniel Guile, of the Ironfounders' Society, when the desirableness of forming a federation of trade societies was unanimously affirmed. It was considered advisable not to restrict the federation to any particular trades, but to extend it to all trade societies which are sufficiently well organized to become a source of strength, not of weakness, to the federation. The representatives, whose names are appended to this address, were appointed as a committee to draft a code of rules, and submit them for the consideration of the various trade societies. It will be evident to those who attentively consider the events of the past two years, the struggles between capital and labor will probably be conducted in future on a far more gigantic scale than we have hitherto witnessed. Our great national societies have, whenever they have been formed on a sound financial basis, rendered the employers in a local contest powerless to cut off the resources of their workmen. When men in any town have been on strike funds have been freely supplied from such localities, under the direction of the central governing body of the society, remunerative employment has been found elsewhere for the men on strike, and the employers have been unable to fully resist the influences brought to bear upon them by the national organizations amongst the men. But in the face of one common danger, it behoves the trades societies of the country to present one united front, and to combine for the purpose of exacting a common fund available whenever an emergency may arise. A federation, to be really useful, should be exclusively composed of trades already organized on a sound financial basis, capable of successfully grappling with any or many difficulties." The rules for the government of the federation will be discussed at Glasgow on October 7th.

Anthracite and Iron in Russia.

The *North American* has given careful attention not only to Russia's progress, but also to the resources of the country. In a recent interesting editorial it has the following:

We have referred at different times, and as fresh information was acquired, to the progress of railway construction and general industry in Russia, and noticed the number of locomotives shipped hence for St. Petersburg and the Crimea, and supplemented the valuable compilation of Mr. Harris-Gastrell, made for the British Board of Trade, respecting the development of industries in this and other countries, with later statistics of Russia than his own. The consular correspondence that is being published piecemeal by our own government shows that Russian progress is what all other reports had asserted, and, describing the coal mines there as far greater and more valuable than was even supposed, discloses that our local agency in their development has not been auxiliary but preliminary and influential. The correspondence suggests that the resources vitalized there by Philadelphia energy and knowledge not only pay tribute to the source from which their awakening proceeded, but that they will, by their nature, amount, position and inter-dependence, have a very great and speedy application to some of the first concerns of international industrial rivalry and the progress of the world. The surroundings of the report give it more value than can be quickly measured.

For some years the Baldwin Locomotive Works, of Philadelphia, have, as we have recorded, shipped their engines to the Black and Baltic seas. Quite recently a representative of this firm called the attention of the imperial government to mines of anthracite coal that exist in the province of Voronesch, considering that they might furnish a supply of fuel for coal burning locomotives. This information has been acted upon. It is found that an area of more than 180 miles, already explored, abounds in an excellent and pure anthracite, every way suited to the requirements of the American locomotive, that has not only excluded British, Belgian, Austrian and every other for superior power and speed, but has monopolized the Russian market on this account despite its greater cost. The discovery will, of course, require more locomotives; and the locomotives, using and distributing the coal, will carry its values very far and make it of more worth to the empire than Khokan—a factor in commerce and trade and manufactures and every use, and a powerful agent in the solution of questions whose results cannot be apprehended now.

The region thus suddenly called into notice lies 200 miles north of the Sea of Azof, and is cut by the river Don. The great railway from St. Petersburg to Moscow and Odessa passes within 50 miles of its western limit, and the Don, that divides it, is navigable by large vessels half the year. A canal connects the Don and its tributary, the Voronesch, with the Volga, and thus gives access to the Caspian. The latitude is that of Warsaw, Dresden, Antwerp and London. The province has 2,000,000 of inhabitants. There are six towns and cities, of from two to four, seven and forty thousand inhabitants; and they have an imperial palace, citadels, fairs and magazines, and build ships for the Black Sea. The crops include wheat and corn, rye, hemp, tobacco, the vine; sheep are raised by the million; fine cattle and horses abound; there are manufactures of iron, woolen and soap, and lime is abundant. This is the region—these are the resources—the Baldwin Works have brought into notice. Their native abundance and position, the desire of Russia and the want of other countries, and especially the great rivalry for Asiatic trade and political influence, show they must be rapidly improved. There is a genial climate; there is the food, animal and cereal; there is the population needing employment; there is the commerce of the sea and of the great interior to furnish employment—the Asiatic frontier only 500 miles away; there are the railways and ships; and now there is excellent and inexhaustible anthracite for utilizing the iron and consuming the agricultural product on the spot, by a race employed in manufacturing the iron and wool and hemp and lumber.

Every one can connect these facts and reach a conclusion. There is but one result possible to the province—and that the very same that is making the Western region bordering the Black Sea, more active than it ever was. The province must grow in population, wealth and power, and its manufactures and commerce must expand quickly while English fabrication, charged with the cost of imported food, charged with German competition at its very doors and with rivalry everywhere, will encounter new difficulties before it has recovered from recent and not only see the Asiatic continent cut with a Russian railway soon, but see it transporting the iron and woolen and other fabrications of this Russian region to supply natives it has sought to govern. No alternative is possible; for the emancipated serfs want the work this discovery furnishes and Russian policy seeks Central Asia, and seeks it with Russian industries in exchange for all that is grown or raised or made on the way, and all that is found in China. The railway is more than a project, and these advantages are on its very line. The consequences must tell in Europe as well as in Asia, and in every concern, as in iron fabrication. It is needless to try and forecast these consequences, derived from so great a territory, having so many natural advantages. They will certainly enable Russia to make greater strides, and we, whose knowledge and skill have contributed so much to prepare the struggle, will find that the rapid development of our own iron interests is more important than it has ever been. Fortunately the Russian advantage is only a parallel to our own, and her progress is enhanced by American knowledge and machinery.

The following statistics from other sources will be interesting in connection with the above. A report presented to the Technical Society of St. Petersburgh shows that a large portion of the manufacturing establishments of Russia are in the hands of foreigners. In the district of St. Petersburgh, foreigners own 28 out of 32; in the province of Moscow 22 out of 47; in the district of the Vistula 6 out of 14, and in the Baltic provinces 21. There are 167 works in Russia for the construction of engines, exclusive of the imperial establishments, and three-fourths of these make locomotives and and other railway plant. Large numbers of the locomotives used on Russian railways are, nevertheless, made in America. The 167 establishments mentioned above use engines of over 6000 horse-power, and employ 41,382 workmen. They consume yearly 138,000 tons of pig iron, 164,898 tons of wrought iron and 127,000 tons of fuel. The iron works of the Ural alone produce 70 per cent. of all the pig iron obtained in Russia, but there is room for many more iron works in that region, especially since the discovery of large coal fields within railway distance of them.

The Water Works of Virginia City, Nevada.

The people of Virginia City, Nevada, claim to have the best and purest water of any community in the world; and when it is stated that the supply is obtained from a pure mountain creek, rushing down fresh and clear from the region of perpetual snow, the claim will be pronounced reasonable. But this priceless boon was attained at the expense of immense labor and the application of great scientific skill, by which was overcome the huge obstacle of the Washoe Valley, which had to be crossed by the main pipe. The supply is from Dall's Creek, near Lake Tahoe in the Sierra Nevada mountains. The water is brought in an eighteen inch flume, four miles long, to a spur overlooking the Washoe Valley, 2100 feet above the Virginia and Truckee Railroad track. There it is received in an iron pipe, which descends into the valley, crosses it and ascends on the other side to the hight of 1540 feet above the railroad track at Lake View station. The length of this inverted syphon is a little less than seven miles. The amount of water thus introduced into the city is two million gallons per day, though this rate can be largely increased by a continuous full head of the supply. The leading of such a stream of water across such a valley is said to have no parallel in hydraulic engineering. The pressure on the pipe is enormous, and is estimated as the same as a column of water 1720 feet high. The orifice of the pipe is 12 inches in diameter. At the point where the pressure is greatest it is five-sixteenths of an inch in thickness, and riveted together with five-eighth inch pipe-rivets. As the pressure grows less, the thickness of the pipe is decreased gradually till it reaches one-sixteenth of an inch. The amount of rolled iron used in the manufacture of the pipe is 1,150,000 pounds. A million rivets were used in its construction. It took 50,000 pounds of lead to fasten the joints of the sections. Before being accepted for use, each length of pipe was heated to the temperature of 380°, and plunged in a bath of asphaltum and coal tar, to prevent corrosion. The line of pipe is compelled to twist and curve to fit the inequalities of the ground, and crosses 13 steep canons. At the bottom of each depression there is a blow-off cock, used to remove any sediment that may accumulate. At each elevation is an air vent. The water, when received into the pipe from the flume passes through wire screens and charcoal.

Royalty at Sheffield.

The *Ironmonger* gives an interesting account of the recent visit of the Prince and Princess of Wales and suite to the works of Messrs. Joseph Rogers & Sons, Sheffield, from which we condense the following, with only the passing remark that we should think the visit would have been a great deal more interesting if fewer preparations had been made. The last paragraph will be especially interesting to American manufacturers. When we have said the same thing in substance, the English papers have usually felt it incumbent upon them to deny it:

As soon as it was definitely known that their Royal Highnesses would visit the works, the show rooms, the approaches to them, and other parts of the great premises were placed in the hands of the most skilled of decorators and upholsterers, and were by them transformed into marvels of beauty and elegance. The royal party arrived at the works on the Tuesday afternoon about two o'clock. In addition to their Royal Highnesses there were the Duke of Norfolk and his sisters the Ladies Howard, Lord and Lady Manners, Lord Wharncliffe, the Archbishop of York, the Mayor and Mayoress, &c. They were received in the entrance hall by Mr. Newbold, chairman of the company; Mr. Joseph Rogers, vice-chairman; Mr. Bardwell, Mr. Melstrop and Mr. Watson directors. The royal party first proceeded to see the elementary work of making cutlery, and to avoid tediousness and to facilitate the view the manufacturing forces were concentrated. Five forging shops had been converted for the occasion into a miniature manufactory, and in them the royal party saw from a magnificently upholstered pavilion the entire process of forging the blades of knives. From the same pavilion could be seen workmen industriously engaged in various departments of knife manufacture. One man was engaged carving a figure of Shakespeare on ivory handles. The attention of Her Royal Highness was arrested by the ease and skill with which he performed his work, and at the request of the Princess he entered into a description of his beautiful art. The next operation of interest witnessed was the "putting together" of pocket knives, a prominent specimen among which was the "Royal Motto Knife," the handle of which contained excellent likenesses of their Royal Highnesses, and also of the Duke and Duchess of Edinburgh. With these knives they were immensely pleased. Next were visited the table cutlery warehouse, where a large number of young women were engaged wiping and wrapping up finished goods; and then the manager's room, in which is kept an immense stock of ivory handles. The various descriptions of ivory were inspected with much interest, and, in answer to questions, they were informed that the rich creamy looking ivory from Africa was the best. Proceeding along a corridor expressly erected for the occasion, the visitors came upon a "grinding wheel," one of the queerest looking places that could well be imagined. In it some twenty men were engaged grinding and polishing knife blades, razors and scissors, and, undeterred by the noise, the royal party sat down at the end of the room and listened with evident interest to the explanations given of the operations that were going on.

The last and most deeply interesting place of all to be inspected were the show rooms. They were most elaborately and gorgeously decorated and fitted up, and contained, perhaps, as large and unique a collection of cutlery and plated goods as was ever seen. To illustrate the skill and ingenuity of workmen, the royal party were shown twelve pairs of scissors, of microscopal proportions. Then by way of contrast there was pointed out a mammoth pair of carvers six feet in length, with handles of solid ivory. Glass cases containing the choicest productions of the firm were examined; every description of knife and razor and scissor, hafted in every description of material, and ornamented in the highest style of art or got up in the planest manner possible. One case arrested the attention of the Prince. It contained a lot of sporting knives; and amongst them a Highland dirk, similar to those made for the King of Siam. The handle is of carved ivory mounted with silver. Then came the really unique productions of the firm. First of all, the "Norfolk" knife, containing 220 instruments—all dissimilar, all perfectly separate, all closing into one handle, and forming really a pocket knife. On the blades are etchings of royal personages and royal residences, and also of places of local interest. The handle is of carved pearl; and on one side is a representation of a boar hunt, and on the other side of a stag hunt. The backs of the blades are exquisitely ornamental. It has been exhibited on several occasions, and has never failed to be regarded as a marvelous piece of workmanship and skill. It has been the practice of the firm for some time to manufacture every year a knife containing as many blades and instruments as there are years in the Christian era. When the royal visitors had pointed out to them a knife containing 1875 blades they were filled with astonishment, and well they might be, for such an instrument is not to be seen anywhere else. The knife this year is regarded as one of the finest pieces of cutlery in the world. There was also shown a miniature sporting knife, about an inch in length, which had no less than 75 blades. These and other curiosities were pointed out, as well as what might be termed the ordinary productions of the firm, and in inspecting them all the royal visitors took the deepest interest.

Just before the departure of their Royal Highnesses Mr. Newbold exhibited to them a magnificent case of ladies' cutlery wrought in solid gold. The case included four pairs of ladies' scissors studded with gold, a gold thimble, a richly chased gold-handled penknife, bodkin and other articles. The whole was enclosed in a shield case of puce velvet, lined with white satin. Mr. Newbold informed her Royal Highness that the case had been made expressly for her use, and in the name of the company begged her acceptance of it. For the Prince a splendid pocket sporting knife had been prepared. The handle was of pearl with gold fittings, on one end the Prince of Wales' feathers and on the other a richly engraved coronet in solid gold. After the specialties of this really elaborate piece of workmanship had been pointed out, Mr. Newbold asked his Royal Highness to accept it.

The workmen employed by the firm number from 800 to 1000, and they were immensely pleased with the gracious manner in which the royal pair acknowledged their expressions of loyalty. Their Royal Highnesses have seen how cutlery is manufactured; but they would be greviously mistaken if they thought the operation was generally carried on under circumstances as favorable as they witnessed it at Messrs. Rogers. There is no one of our local trades that is carried on in dirtier, more unhealthy workshops; no trade in which a great mass of the workpeople are more wretchedly remunerated; no trade in which there is more gambling and drinking, and, consequently, no trade in which there is more poverty and squalor and want. The efforts made by employers to introduce variety and a higher style of art into the trade generally are not appreciated by the workmen, who handicap any new pattern with such penalties that it cannot be brought out to advantage. What is felt to be needed is a thorough revision of all the terms existing between the masters and the men; but such a reform is scarcely probable. Both sides admit that the ordinary work of making knives is underpaid, and the men endeavor to recoup themselves by charging out of proportion for every "extra" required. The old trade is full of anomalies, but the fathers submitted to them, and the children appear content to do the same.

Electro-Plating.

Gilding by galvanic action was produced as a laboratory experiment as early as 1805; but it was more than thirty years afterward, or about 1835, that this interesting process was formally applied to the arts, substantially as now done. As it may interest some of our readers to learn how this interesting process is accomplished, we append a brief description as follows: For coating articles with silver, a bath is made consisting of one part of cyanide of silver to two or three parts of cyanide of potassium, dissolved in about 150 parts of water. The article to be plated is made the negative pole, and the plate of silver from which the plating is derived is made the positive pole, both being connected by suitable wires with a galvanic battery of an intensity suited to the amount of work to be done. The silver, when deposited upon the article to be plated, has a dead, silvery appearance, and wherever luster is required it is brought out by a suitable application of polishing appliances. Great care is taken to have the articles to be plated thoroughly cleaned by acids, and rinsed in clear water. Every particle of grease or corrosion must be carefully removed, or the plating will not adhere. Any thickness of metal may be given according as it may be desired, by keeping the article in the bath for a longer or shorter period. From three to six hours is the time usually employed. For silver, one-half an ounce to a square foot forms a very suitable plate.

In gold plating, the double cyanide of gold is employed in the solution, instead of the cyanide of silver as above described, while the positive pole consists also of a plate of gold.

Paper and other fibrous materials may be electro-plated by first rendering them good conductors of electricity. This may be accomplished by immersing such articles for two or three hours in a solution of nitrate of silver, with ammonia added, until the precipitate first formed is entirely dissolved again. After this immersion, the articles are thoroughly dried, and then exposed to a current of hydrogen gas, by which means the silver is reduced to a metallic state, and the articles are rendered sufficiently good conductors to be electro-plated in the usual manner. Fibrous articles so prepared are as yet considered as mere curiosities, although the art is a beautiful one, and one which might be utilized to much advantage in the way of ornamentation.

An Important Coal Discovery in Wyoming Territory.

An extensive deposit of very excellent coal has lately been discovered in Uintah county, Wy. T., 18 miles Northwest of Carters Station, on the Union Pacific Road. It has been named the Mammoth Sandstone Mountain Coal Mine. It was discovered by Mr. Crocker, of Logan, Utah, from information given him by an old Indian. The vein is in a sandstone mountain about four and a half miles long, running north and south, facing east, and about three-quarters of a mile across; the mountain dipping suddenly at each end. There are sixteen veins of coal in sight, the bottom one is the smallest, being five feet; the next is the largest and most easy of access, and is upward of 70 feet thick; the next above is 60 feet; another of 40 feet; another of about 30 feet; five of about 20 feet each, and five of 16 feet each. The last one is about 12 feet, altogether about 400 feet of coal, four and a half miles long; in fact, it may be correctly termed a mountain of coal.

The veins lay at an angle of 22°, with ledges of white sandstone intervening. The coal is very bright, is perfectly free from slate or dirt, and is said to be cannel coal. A small quantity of the croppings from the 70 feet vein has been tested for coke by John McVicker, an assayer of Salt Lake City, who states that it yields coke 53 and two-tenths per cent., which may be considered a very good return. Professor Pontez, of Omaha, geologist to the Union Pacific Railroad, has made an investigation of the mine, and reports it as the finest deposit of coal in Western America. The Professor is now in Omaha, making out maps of the coal region, and the route to it by way of Bear River, which he intends to take to San Francisco about the 1st September, to lay before the Directors of the Central Pacific Railroad. It is understood to be the intention of the owners to lease the mine, taking a royalty on each ton mined.

Shafting for the Centennial.

We have received the following from the Director General of the United States Centennial Commission:

Manufacturers of machinery are invited to send to the Director General of the International Exhibition, at the office of the Commission, No. 903 Walnut street, until 4 o'clock, p. m., Saturday, October 15th, 1875, propositions for one to eight lines of shafting, including hangers, couplings and main driving and guide pulleys, for supplying power in Machinery Building; seven lines of shafting to be 624 feet in length, and to transmit 180 horse-power, and one line to be 352 feet in length, and to transmit 120 horse-power, to be applied at the ends of the shafts, the bearings, except for the head shafts, to be eight feet apart; hangers to have 13 inches drop, except those for the head shafts, which will be 11 inches.

There will be seven lengths of this shafting to run at a speed of 120 revolutions, and one length to run at a speed of 240 revolutions per minute; generally, the diameters exclusive of the "head" and second shafts will be 3 and 2½ inches respectively.

All of the above mentioned machinery to be transported, erected and removed at the close of the exhibition, at the expense of the exhibitor, and must be ready for use by the 1st of March, 1876.

If accepted, it will be subject to the control of the Commission, from that date until the close of the exhibition, and will be considered as having been entered for exhibition.

For more detailed information, parties wishing to make proposals will be furnished with "tracings" on application, by the Chief of the Bureau of Machinery.

The Centennial Commission reserves the right to reject any or all propositions that may be made in answer to this circular.

A. T. GOSHORN,
Director General.

JOHN S. ALBERT,
Chief of Bureau of Machinery.
PHILADELPHIA, Sept. 20, 1875.

Japanese Money.—One of the greatest curiosities in Japan to the stranger is the wonderful variety of coins that are used daily. In some instances it takes one thousand pieces to make one dollar. These are called "cash," and are seldom received by foreigners, who, as a general rule, refuse to take them in change. Imagine making a trade of five cents and giving a man a fifty-cent piece, then receiving four hundred and fifty of these coppers. This coin is peculiarly made, having a square hole in the center. They are about the size of our dime pieces, and nearly two-thirds of the thickness. Next to this comes the quarters of a cent, then the half-cent, eight-tenths of a cent, and the one and two-cent pieces. In silver coins they have the five, ten, twenty, fifty-cent and one dollar pieces. In gold the one, two, five, ten and twenty dollars, which are very pretty coinages indeed. Next to this comes the government series of paper money, in various denominations, ranging from five cents to one hundred dollars. This money is made on quite inferior paper to ours, and from general appearance will not last like the American money.

Trade Report.

OFFICE OF THE IRON AGE,
WEDNESDAY EVENING, Sept. 22, 1875.

The leading trade journals of the principal business centers of the country have lately indulged in very hopeful expressions with regard to the fall and winter trade. The only marked exception to this is found in the case of the New England cities, where commercial activity depends upon the activity in manufacturing. Until the mills and factories are running again upon full time, the great mass of consumers will be compelled to buy sparingly, and the retail dealers do not care to lay in any considerable stocks until there is more likelihood than now of disposing of them to good advantage. In Philadelphia, though a manfacturing center, the prospects of the season's trade are very much better than in Boston, according to all accounts; while from Baltimore, Cincinnati, Louisville, Chicago and St. Louis the reports are favorable. In this city the commercial outlook seems to be improving every day. Advices from the agricultural districts report satisfactory progress in the harvesting of the crops and their preparation for market, and as fair prices are likely to be realized by the farmers, the currency thus set in motion should afford a basis for a good retail trade throughout the South and West. The *Commercial and Financial Chronicle* has published its annual compilation of cotton statistics, showing the total crop this year to be 3,832,991 bales, or within about 30,000 bales of the crop of last year.

The money market has developed a tendency to greater firmness, but good borrowers have had no difficulty in obtaining all they wanted. Call loans have been freely made at 2½ @ 4 per cent., with 6 per cent. as the exception. Business paper is discounted at 5 @ 7 per cent.

The gold market has been firm, and the premium has gone as high as 117¼. Borrowers have had to pay as much as ¼ of 1 per cent. per day for the use of coin. The advance in the premium, as well as in the rate to borrowers, has resulted from the scarcity of coin in the market. The supply is reduced to about seven millions, the greater part of which is held by a strong clique who are making the most of the advantage thus given them. Foreign exchange has ruled extremely low, and considerable gold has been ordered from London to furnish the means needed to move exchange and keep up the export trade. The following shows the daily range of the premium:

	Highest.	Lowest.
Thursday	116¾	116½
Friday	116⅝	115¾
Saturday	117	116¾
Monday	117¼	116¾
Tuesday	117¼	116¾
Wednesday	116¾	116¼

The stock market has been strong and somewhat buoyant, with principal dealings in Lake Shore, Union Pacific, Western Union, Pacific Mail, Erie, St. Paul and Northwest. We give below the closing quotations of active shares.

Government bonds are strong, in sympathy with gold. Railroad mortgages are strong, and in moderately active investment demand. We give below the closing quotations of governments.

The following is a comparison of the bank averages for the past two weeks:

	Sept. 11.	Sept. 18.	Differences.
Loans	$283,443,200	$282,071,800	Dec. $1,371,400
Specie	9,378,200	7,386,500	Dec. 1,991,700
Leg. tend	69,185,200	67,938,000	Dec. 1,247,200
Deposits	242,605,100	239,881,300	Dec. 2,723,800
Circulation	17,756,600	17,754,800	Dec. 1,800

The following shows the movements in foreign trade for the week:

IMPORTS.

	1873.	1874.	1875.
Total for week	$6,773,846	$6,609,932	$5,762,468
Prev. reported	290,533,462	288,767,563	244,857,909
Since Jan. 1	$297,309,308	$295,497,515	$250,620,377

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Anvils	55	$540
Brass goods	21	8,554
Bronzes	67	13,013
Chains and anchors	70	2,846
Cutlery	101	29,005
Guns	49	10,895
Hardware	6	1,031
Iron, pig, tons	594	10,979
Iron, sheet, tons	133	22,831
Iron, cotton ties	2,350	3,509
Iron ore, tons	97	149
Iron, other, tons	443	31,631
Lead, pigs	800	4,952
Metal goods	160	20,255
Nails	31	1,858
Needles	13	7,135
Old metal		1,079
Platina	1	744
Per. caps	6	1,468
Saddlery	11	2,367
Steel	2,160	28,002
Tin, boxes	18,662	139,907
Tin, bbls	50	2,139
Wire	28	3,244
Zinc	47,850	3,193

EXPORTS, EXCLUSIVE OF SPECIE.

	1873.	1874.	1875.
For the week	$6,501,318	$4,354,734	$1,620,232
Prev. reported	202,171,969	208,359,021	177,288,970
Since Jan. 1	$208,673,287	$212,713,745	$181,909,202

EXPORTS OF SPECIE.

Total for the week	$343,500
Previously reported	64,249,329
Total since January 1, 1875	$64,592,829
Same time in 1874	41,839,443
Same time in 1873	40,926,206
Same time in 1872	57,252,820

Government bonds at the close were steady at the following quotations:

	Bid.	Asked.
U. S. 6s, 1881, cou	123¾	123¼
U. S. 6s 1881, reg	121	121¼
U. S. Currency 6's	123½	123¾
U. S. 5-20 1867, reg	118½	119
U. S. 5-20 1862, cou	118½	119
U. S. 5-20 1864, reg	118¼	119
U. S. 5-20 1864, cou	119¼	119¼
U. S. 5-20 1865, reg	119	119¼
U. S. 5-20 1865, cou	119¼	119¼
U. S. 5-20 1865, reg. new	119	119¼
U. S. 5-20 1865, cou	119	119¼
U. S. 5-20 1867, reg	120¼	121
U. S. 5-20 1867, cou	120¾	121
U. S. 5-20 1868, reg	121¼	121¾
U. S. 5-20 1868, cou	121¼	121¾
U. S. 10-40 reg	116½	116¾
U. S. 10-40 cou	117¼	117⅞
U. S. 5s, 1881, reg	117¾	118
U. S. 5s, 1881, cou	118¼	118¾

The following are the closing quotations of active stocks:

	Bid.	Asked.
N. Y. Cen. & Hudson Consolidated	103¾	103¾
Lake Shore	53¾	53½
Rock Island	107¾	107⅞
New Jersey Central	110¾	111¾
Del. Lack. and Western	130¾	130⅝
Fort Wayne	98¾	99¾
Michigan Central	57	58
Cleveland and Pittsburgh	90¾	91
Illinois Central	97	98
Panama	131	138
Wabash	5¾	6
Harlem	131½	133
Canton Land Co	50	—
Western Union Telegraph	75¾	75⅝
Atlantic and Pacific Telegraph	20	20½
Northwestern	39¾	39⅝
" Pref	53¾	54
Milwaukee & St. Paul	34½	34⅝
" Pref	63¾	63½
Pacific Mail	35¾	35⅝
Erie	16¾	16½
Ohio & Mississippi	15⅝	15⅞
Union Pacific	70	71
Kansas Pacific	11	11¾
Missouri Pacific	46¼	48½
Atlantic and Pacific Pref	10¾	11¾
C. C. & Ind. Cen	4	4¼
Hannibal & St. Joseph	20¼	20⅞
NewJersey Southern	2¾	3
Quicksilver	15¾	16
" Pref	20¾	22
Mariposa	10¾	10⅞
Consolidated Coal	45¾	45¾
American Coal	49⅞	50⅛
Adams Express	101½	101¾
Wells, Fargo & Co. Express	78	79
Am. Exp. Union Express	58	59
United States Express	44	45
Iron Mountain	—	—

GENERAL HARDWARE.

Nothing of importance has transpired in the Hardware trade since our last writing, and prices continue firm and unchanged. The demand for the South and Southwestern markets is favorably spoken of, but general business fails to respond to the anticipations of the trade.

The demand for Nails is improving, but the tone of the market continues weak. We quote 10d. $3·10 @ $3·20, net, according to quantity.

The Russell & Erwin Mfg. Co. have in stock a full assortment of Barney & Berry's Club and Rink Skates, the Acme Club, and the Florence Skates, which they offer at the following lists and discounts:

Barney & Berry's Skates.

	Per pair.
New York Club	$2·75
B. & B.	3·50
All-Clamp	4·25
Rink	8·00
Single Keys	·15
Heel Plates	·10
Nickel Plating	2·00
Single Clamps	·20
Single Clamp Screws	·10

Discount 25 per cent.

Acme Club Skates.

No. 5 ..... Price, $4·00 per pair.

This is the cheapest Skate. The runners are made of all steel and not hardened, and the working parts are equally reliable with the best, although not so well finished.

As a cheap Skate they give general satisfaction.

No. 7 ..... Price, $5·00 per pair.

Welded steel and iron runners of the best quality, and thoroughly hardened and tempered, nicely finished in handsome design. Exceedingly simple in construction, substantial and reliable in every particular. They are pronounced the very best Skates made.

No. 10 ..... Price, $7·00 per pair.

Electro nickel plated—same quality as No. 7, nickel plated. This improves their appearance, retaining their bright finish and ensures freedom from rust.

No. 12 ..... Price, $7·50 per pair.

Electro silver plated—same quality as No. 7, silver plated—making a very handsome appearance.

No. 14 ..... Price, $8·00 per pair

Electro gold plated tops and electro silver plated runners. These also are similar in quality to No. 7. The gold and silver plating together is novel and beautiful.

Discount, 20 per cent.

Florence Skates. Every Skate Warranted Steel, and Free from any Imperfection.

The Florence Steel Skate. "The Skate for the Million."

Price, $1·00.

The runners of this light, strong and elegant cheap Skate are made of highly tempered steel castings, with Japanned metal sole and heel plates, and are furnished with heel sockets and screws, and strapped ready for use.

Discount 25 per cent.

The Florence Spring Skate. With clamps and straps combined. Highly polished, forged steel runners, with blued steel plates and clamps.

Price, $3·00.

The spring Skates are fastened to the feet by both clamps and straps. The sole clamps are entirely sufficient of themselves to hold the Skate firmly to the sole of the boot, the strap being added to brace the foot closely to both the boot and the Skate.

Discount 30 per cent.

Florence All-Clamp Spring Skate, highly polished, forged steel runners, with blued steel plates and clamps.

Price, $3·50.

This style of spring Skate is fastened to the foot by clamps only, which, when once adjusted to the boot, needs no further re-adjustment for the season, for the same boot, and is readily slipped on and instantly fastened by a few turns of the thumbscrew at the heel. And while no straps are necessary for perfect safety, straps can be used as a support to the foot and ankle if desired. The clamp fastenings are more positive than any other in use, and far less liable to loosen. The thumbscrew being a part of the Skate, can at any time be tightened, and there will be no searching for or fumbling over a separate key or wrench, with benumbed fingers. Nor are there any exposed parts to be clogged with ice.

Discount 30 per cent.

Peck & Snyder, No. 126 Nassau street, quote their Patent Self-Adjusting American Club and the Clipper Club Skates at the following list, less 25 per cent. discount to the trade:

Peck & Snyder's Patent Self-Adjusting American Club Skate.

For Ladies, Gentlemen or Boys.

	Per pair.
No. 1, With blued footplate, and runners the same as the best	$5·00
No. 2, Same as No. 1, only nicely nickel plated, which effectually prevents the Skate from rusting	6·00
No. 3, Same as No. 2, only before the Skate is put together each part is finely polished and heavily nickel plated—the finest Skate ever offered	8·00

In ordering, send length of shoe from heel to toe, or order by sizes in inches, which correspond with length of shoe. The sizes made are 8, 8½, 9, 9½, 10, 10½, 11, 11½ inches.

The Clipper Club Skate.

Sizes same as the American Club.

	Per pair.
No. 1, Blued Footplate	$3·50
No. 2, Full Polished	4·50
No. 3, Full Polished and Nickel Plated	6·00

J. Clark Wilson & Co. have in stock the following patterns and sizes of Wood Top Skates, manufactured by the Eagle Auger and Skate Co., which they offer at low figures to close out:

	Length of Wood. Inch.	No.	Per pair.	Dis. per ct.
D	8½	3	$0·75	50
D	9	4	·80	50
G	8½	3	·60	40
G	9	4	·65	40
G	11	8	·85	40
N, Wide Mortise	10	6	1·00	50
T	10	6	1·00	50
T	11	8	1·10	50
U	10	6	·77	40
U	11	8	·87	40
Y, Same style as U, C. S. Blade, Wide Mortise	..	..	1·50	
X	8½	3	1·00	50
X, Rocker	..	..	1·00	50

In our publication of the revised list of Blacksmiths' Bellows in last week's issue the price was incorrectly stated per dozen instead of each; the only goods on the list for which the price is stated per dozen are Molders' Bellows. Although it is hardly possible that an error of this kind could mislead any one in the trade, we republish the list corrected, which is as follows:

REVISED LIST OF BELLOWS.

Ordinary or Common Bellows.

Inch	18 to 22	24	26	28	30	32
	$8·50	9·00	10·00	11·00	12·00	14·00
Inch	34	36	38	40	42	44
	$16·00	18·00	20·00	23·00	27·00	32·00

Extra Bellows.

Inch	24	26	28	30	32	34	36
	$11·00	12·00	14·00	16·00	18·00	20·00	22·00
Inch	38	40	42	44	46	48	50
	$24·00	28·00	34·00	38·00	41·00	50·00	60·00

Pittsburgh or Extra Long Bellows.

Inch	24	26	28	30	32	34	36
	$13·00	14·00	16·00	18·00	20·00	22·00	24·00
Inch	38	40	42	44	46	48	50
	$27·00	30·00	35·00	40·00	46·00	55·00	65·00

Molders' Bellows.

Inch	9	10	11	12	13	14	16
Per doz.	$15·00	17·00	20·00	24·00	25·00	28·00	33·00

The North Carolina Handle Co., No. 79 Reade street, issue the following circular to the trade:

TO THE TRADE.

We take pleasure in informing you that we carry a full stock of Handles at 79 Reade street. V. G. Hundley represents us, and is the only agent we have. All orders should be addressed to him. We have recently added Spoke lathes to our machinery, and will be prepared to furnish Spokes in any quantity. Respectfully,

WILSON & SHOBER,
Proprietors North Carolina Handle Co.

We invite the attention of railroads, mills, machinists and manufacturers to the card of H. A. Rogers, 19 John street, on page 19. He has now in stock a large and varied assortment of goods adapted for their use. His new illustrated catalogue of 272 pages will be mailed on application.

W. R. Ostrander, No. 19 Ann street, has issued the following list for his improved Alarm Speaking Tube Whistles, etc.:

The Indicator Alarm Whistles, with round or oval mouth pieces	$11·00
The Plain Alarm Whistle, with round or oval mouth pieces	10·00

Discount on whistles, 50 per cent.

Alarm Whistles for Special Uses.

	Net.
For Banks, etc., heavy plated, all brass whistles	Per doz., $36·00
For Offices, etc., heavy plated mouths on whistles	" 12·00
For Steamers, etc., heavy, all brass polished whistles	" 30·00
For Factories, etc., heavy brass mouths on whistles	" 10·50

Air Tight Speaking Tubes (strongest tube ever made).

1 inch diameter (regular size) per 1000 feet	$25

Strong Air Tight Elbows to fit the Speaking Tube.

1 inch diameter (regular size) per 100	$3·00
" " stamped "	9·00
Bell Tube for Bell Wires, per 100 lbs	$18·00
Bell Boxes " Levers "	5·00

William R. Hull, Detroit, Mich., has published in book form his compilation of classification lists of American Hardware. Among the most important lists treated in this way is the Standard Knob and Lock lists, Cabinet Locks, Boxwood and Ivory Rules, Spring Balances, etc. In addition the work contains a number of valuable tables pertaining to manufactures of Iron, Copper, Brass and Lead, which will be found useful in the construction of estmates. The book is presented in neat style, and contains over 60 pages of tables. Particulars regarding price, etc., will be found in avertisement on the 20th page.

Bissell, Welles & Millet will sell at auction on Tuesday and Wednesday, 28th and 29th insts., at their salesroom, No. 15 Murray street, an assortment of Hardware, Chains, English and American Files and Pocket Cutlery, and about 3600 dozen American Table Knives and Forks. Their advertisement will be found on the twentieth page.

BRITISH IRON MARKET.

(Specially reported by cable for The Iron Age.)

WEDNESDAY, Sept. 22, 1875.

Scotch Pig.—There was an advance in prices immediately following our last dispatch. The market has ruled strong, with a good business doing. The following are makers' prices:

Glengarnock No. 1	71/
Eglinton No. 1	65/6

Manufactured Iron.—There is an improved demand, and a fair amount of business has been done. Prices are firmer.

Rails.—The market rules quiet, and prices are nominal.

IRON.

American Pig.—The market continues in the same state of dullness that has characterized it for a long time, and the only change seems to be in the direction of greater depression. It is evident that a satisfactory state of things cannot be restored in Iron producing circles until either the consumptive demands of the country become equal to the present very large productive capacity, or this capacity is greatly lessened by the wiping out of existing establishments. The latter operation seems to be progressing rapidly at present, while the wants of the country are not for the moment perceptibly growing. Thus the market is not only depressed by the natural competition of sound and well established concerns, but is demoralized by the offers of weak producers and by lots in second hands, on many of which advances have been made. Sales during the week have not been large with the exception of one sale of 600 tons on private terms. The business has been confined to lots of from ten to a hundred tons, as wanted for consumption. We quote No. 1 Foundry, $25; No. 2 Foundry, $23; Gray Forge, $20 @ $22.

Scotch Pig.—There have been receipts since our last of about 300 tons, of which some has been put in yard. We quote Coltness $32 @ $33; Gartsherrie, $32 @ $32·50, and Eglinton, $29 @ $30. We note sales of 100 tons Glengarnock from ship, on private terms, and 50 tons Summerlee at $31·50.

Rails.—We continue our quotation of $45 @ $50, at mill, according to section and quality, as well as location of mill. We note the sale of 1000 tons Iron and 2000 tons Steel, both Western delivery, on private terms.

Old Rails.—There have been no recent transactions, and in the absence of business we withhold quotations.

Scrap.—We quote Wrought Scrap, in wholesale lots, $31 @ $33, and note sale of 150 tons from yard at $32; also 550 tons, in lots, on private terms; 400 tons old Car Wheels and 60 tons Scrap Spring Steel, on private terms.

METALS.

Copper.—The market has been quiet but firm during the week, sales to manufacturers and dealers amounting to between 300,000 and 400,000 pounds at 23¼c. @ 23⅝c., all Lake Superior. Nothing has been done in futures. Baltimore we quote nominally 23½c.; sales are limited to small parcels. London cabled on Saturday, Chili Bars £81. 10/, and Best Selected, £88. Private dispatches have since been received, quoting Chili Bars £81. According to a letter we have seen, Chili Bars stood £82 on the 9th instant, and Wallaroo £93. On the 1st instant Chili Bars stood £83, against £78 a year ago, £84 in 1873, £90 in 1872 and £67 in 1871. The foregoing reports show that thus far during the present month Chili Bars have been coming down from the recent improvement. This has probably been due to the telegrams from Valparaiso advising more extensive charters. Statistically, the situation on the other side has become less favorable during the month of August, notwithstanding the large French purchases at the commencement of it, for on September 1 the visible supply was 32,342 tons, against 29,704 August 1. On comparing the 1st instant, however, with former years, it will be seen that the position is strong as it is: September 1, 1874, 33,159; 1873, 37,321; 1872, 37,733, and 1871, 39,680. The manufactures of Copper have remained steady, as follows: New Copper Sheathing, 30c.; Bolts and Braziers, 31c.; Bronze and Yellow Metal Sheathing, 22c., and Bolts, 28c.

Tin.—Although not much business has been done in this metal, the market has remained very strong, and the confident feeling in its immediate future has not abated in the least. We quote large lots in gold as follows: Straits, 19c.; Malacca, 19¼c.; English Refined, 19¼c.; ditto Common, 19c.; and Banca, 23½c., all gold. Some good offers to buy Malacca to arrive in December have been declined. The upward movement in Europe has remained unchecked. A week ago Straits was cabled from London £82. 10/, while now it has reached £85. But a short time ago, it will be remembered, it was down to £77. 10/, when the large deliveries began to call attention. August has again been a month of large distribution, there having been dealt out to consumers in England and Holland, 1917 tons, against 1587 and 1260 in 1874 and 1873, while since January 1 the amounts thus absorbed were 13,668, against 11,115 and 9378. But the visible supply September 1 was still 13,737, against 10,281, and 9310 in 1874 and 1873. Should, therefore, the demand be materially lessened or large shipments to England resumed, the metal would be apt to recoil for a while, however cheap it may still be considered. English Common is wired £90, at which figure it cannot be laid down below 19⅝c., gold, here. We have, consequently, to advance ⅝c., gold, ere we are on a par with England. Singapore wires $22·75 per picul for Malacca Tin, thus steadily following in the wake of the advance at home. *Tin Plates.*—The unsatisfactory position in which this article is placed on both sides of the water has not improved, but several works in England have begun to suspend operations, as it is impossible to go on without heavy loss, since the material and labor have become dearer. The market here has remained quiet; in England it has also been dull, closing weak. We quote, in large lots, gold, per box, ordinary brands, as follows: Charcoal Bright, $7·37½ @ $7·62½; ditto Ternes, $7; Coke Tin, $6·50; and Ternes, $6·25; all gold.

Lead.—Business in Domestic Lead has remained as stagnant as can be, sales not exceeding 100 tons, in lots, at 5·80c. @ 5·85c., gold. It could, in all likelihood, be purchased at 5¾c., gold, in larger parcels. From California about 1000 tons have been shipped by steamer and sailing vessels, and will be here within the next 60 days, probably. At St. Louis, soft Lead still commands 7c., currency, equal to 7·30c., currency, here. Ordinary Foreign has sold at 7¼c., gold, and cannot now be had under 7¼c.; stock 100 tons. The European tendency remains upward; the leading governments have been in the market all along, especially Russia. The latter country, has of late, been absorbing large quantities of the metal, partly, it is supposed, in excess of former years, for industrial purposes. France bought for armament 1500 tons at Marseilles. Latest London quotation: £23. 10/ for Soft English Pig. Manufacturers of Lead remain supported here as follows: Bar, 8¾c.; Pipe, 9¼c., and Sheet, 9½c., less 10 per cent. to the trade.

Spelter and Zinc.—While here the price of Domestic Spelter has been steadied, probably by the fact that the outside offerings have ceased, and it now brings 7¼c., currency, without difficulty. On a moderate trade Foreign has been limited higher from the other side, and now stands 7½c. @ 7⅝c., gold, without any spot or afloat dealings to record. The following is from Hamburg, by mail, just to hand: SEPT. 9.—"The activity in Spelter continues unabated, and at Breslau 3000 cwts. 'Kramsta' sold at 23·25 marks; 'Silesian Union' there sold at 23·30, and 'Godulla' at 23·50. Here of D. H., common, 500 cwts. sold at 24·90. Godulla, all the way to November, has been all sold out." Sheet Zinc is steady at 8¾c. @ 9c., gold, as to size.

Antimony.—There is little doing, and prices remain between 13¼c. @ 13½c., gold, per pound.

COAL.

As the Associated Coal Companies have announced the advance in the price of Coal for the month of October, business during the latter part of the week was moderately active. In the retail business at present there is a fair trade doing, and the supply is regulated in accordance with the demand. Stocks, however, are not so heavy as at the current period a year or even two years ago.

The quantity of coal sent from the Schuylkill region during the past week was, by rail, 131,364 tons; by canal, 25,094 tons; total, 156,458 tons, against 128,312 tons for the corresponding period last year. Increase, 28,146 tons.

The quantity sent from all the regions for the week was: Anthracite, 582,365 tons; Bituminous, 77,637 tons; total, 660,002 tons, against 490,340 tons Anthracite, and 67,891 tons Bituminous; total, 558,231 tons for the corresponding period last year. Increase of Anthracite, 92,025 tons, and of Bituminous, 9746 tons. Total increase, 101,771 tons.

The supply sent from all the regions so far this year foots up 12,923,020 tons Anthracite, and 2,532,180 tons Bituminous. Total, 15,455,200 tons, against 13,576,568 tons Anthracite, and 3,053,841 tons Bituminous; total, 16,630,409 tons. Decrease of Anthracite, 653,548 tons, and of Bituminous, 521,661 tons—total decrease, 1,175,209 tons.

The following are the prices charged by the Delaware and Hudson Canal Company for Coal, deliverable f. o. b. at Rondout during the month of October, per ton of 2240 lbs.:

Furnace, lump	$5 05
Steamer, lump	5 15
Grate	5 25
Egg	5 65
Stove	6 10
Chestnut	4 95

We quote as follows: Anthracite, $4·95 @ $6·10; Cumberland, $6·25 @ $6·75; West Virginia, $6·75 @ $8; James River Steam, $6·25; James River Carbonite, $9 @ $9·50; Kanawha House, $11·50; American Gas, $6·75 @ $7·25; American Cannel, $12 @ $14; Pennsylvania and Westmoreland, $6·75; Murphy Run, $6·50; Newburgh Orrel, $6·50; Sterling Ohio, $10; Ince Hall, $17 @ $18; Liverpool House Cannel, $17; Liverpool Gas, $10 @ $12; Newcastle Gas, $8; Scotch, $7·50 @ $9.

The Coal transported over the Cumberland Branch Railroad during the week ending Sept. 18, 1875, amounted to 6366 tons, as against 5504 tons shipped in the corresponding period of last year, showing an increase of 862 tons. Over the Cumberland and Pennsylvania Railroad, for the same period, the shipments were 45,237 tons, against 47,142 tons shipped in 1874, a decrease of 1905 tons. The aggregate amount of Cumberland Coal shipped by the various companies so far this year amounts to 1,648,384 tons.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending Sept. 21, 1875:

Hardware.

Boker Hermann & Co.
Casks, 2
Dreyfus Bros. & Weiller,
Cases, 2
Degraw, Aymer & Co.
Anchors, 3
Darling, Brown & Sharpe
Grindstones, tons, 10
Frasse P. A. & Co.
Files, cks., 2
Field A. & Co.
Mdse. pkgs., 5
Packages, 5
Froggatt E.
Guns, cs., 1
Friedmann & Lauterjung,
Cutlery, cs., 2
Hutchinson J. W.
Arms, cs., 24
King, Briggs & Co.
Casks, 1
Kamak A.
Cutlery, cs., 4
Lang W. Bailey & Co.
Wire, cs., 19
Lau & Garilchs.
Arms, cs., 7
Mdse. pkgs., 1
Merchants' Dispatch Co.
Guns, cs., 1
Leadware, cs., 2
Cartridge cases and wadding, cs., 14
Arms, cs., 12
Murphy A.
Cutlery, cs., 1
Robson J. W.
Guns, cs., 1
Schoverling & Daly,
Arms, cs., 6
Stauller Louis,
Arms, cs., 6
Schuyler, Hartley & Graham,
Guns, cs., 2
Taylor Thos.
Cutlery, cs., 1
Van Wart & McCoy,
Cases, 1
Mdse. pkgs., 7
Van Ness A. R. & Co.
Cases, 2
Ward A.
Mdse. pkgs., 1
Wiebusch & Hilger Mfg. Co.
Mdse. pkgs., 8
Cases, 3
Windmuller L. & Roelker
Arms, cs., 11
Order.
Cases, 3
Grindstones, 208
Wire, bdls., 1840

Iron.

Darrell & Co.
Scrap, tons, 15
Fleitmann & Co.
Plates, bxs., 100
Leaycraft & Co.
Casks, 12
Pieces, 40
Lang W. Bailey & Co.
Bars, 656
Bundles, 65
Naylor & Co.
Bars, 158
Phelps, Dodge & Co.
Sheet, pkgs., 1000
Schmeisser & Co.
Spiegel, tons, 250
Windmuller L. & Roelker
Cases, 1
Order.
Cotton ties, bdls., 200
Spiegel, lots., 1
Scrap, hoops, bdls., 320
Pig, tons, 400
Without bills of lading.
Sheet, pkgs., 1357

Steel.

Brown Wm.
Cases, 10
Bundles, 87
Crabb Wm.
Wire, bdls., 42
Frasse P. A. & Co.
Cases, 1
Hogan John,
Coils, 47
Casks, 8
Lang W. Bailey & Co.
Bundles, 42
Naylor & Co.
Tires, 20
Prosser Thos. & Sons,
Bundles, 63
Tire forgings, 76
Ranft Richard,
Wire, pkgs., 1
Sulzbacher & Hyman,
Bundles, 62
Cases, 10
Order.
Bundles, 381

Metals.

Bruce & Cook,
Tin plates, bxs., 1378
Byrne Joseph & Co.
Tin plates, bxs., 360
Dickerson, Van Dusen & Co.
Tin plates, bxs., 1358
Lamarche H.
Rolled zinc, cks., 315; cs., 6
Leaycraft & Co.
Copper, cks., 3
Brass, cks., 4
Lead, cks., 6
Naylor & Co.
Tin plates, bxs., 923
Phelps, Dodge & Co.
Tin plates, bxs., 797
Windmuller L. & Roelker
Sheet zinc, cks., 10
Order.
Tin plates, bxs., 2237
Tin slabs, 1549
Lead, pigs, 2416
Scrap, pkgs., 37

OLD METALS, PAPER STOCK, &c.

The sales of Old Metals have been very light the past week, and dealers find it an impossibility to dispose of any considerable quantity. There is a better feeling, however, in connection with Wrought Iron, and quotations are more easily obtained. The demand for Paper and Book Stock has fallen off considerably since last week, and prices have a downward tendency. Other articles present no material

change. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 13c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5¼c.; Tea Lead, 4¾c.; Zinc, 4¼c. @ 4½c.; Pewter, No. 1, 18c.; do., No. 2, 8c. @ 12c.; Spelter, 5c. @ 5½c., Wrought Iron, 1c.; Sheet do., ¼c.; Cast, do., ¼c.; Machinery, do., ¾c.

Rags, &c.—Canvas, Linen, 4¾c. @ 5¼c.; do. Cotton, No 1, 5¾c. @ 6¼c.; No. 2, 2¼c.; White, No. 1, 6¼c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5½c.; Gunny Bagging, 1¼c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 2½c. @ 2¾c.

PHILADELPHIA.

PHILADELPHIA, Sept. 21, 1875.

The market shows more activity than at our last report, but no improvement in prices. Some grades of Iron have been even shaded from quotations, while others are held more stiffly. Several of the furnace companies are stiff at $26 for No. 1 Foundry, and will not take less. There are also considerable complaints of carelessness in grading Pig Metal, and a sharper scrutiny is exercised in selections than has been the case hitherto. From some cause, not at present apparent, there seems to be an impression that an improvement in prices is at hand, notwithstanding reports are current that at least twelve furnaces have accepted the proposition of the Reading Coal and Iron Company, and production will be increased by at least that amount weekly when they blow in. Manufactured Irons continue without change. Bars are in fair request only, although most of the near-by mills have orders to keep them occupied for some weeks. Rails are quite active, and the transactions larger than for some time, with contracts pending for considerable lots. Old Rails are in better request, and Scrap without change. We quote the following prices as current in this market, viz.:

PIG IRON.—No. 1 Foundry, $25 to $26; No. 2, $23; Gray Forge, $22.

BARS—2·6c. to 2·8c. per lb.

RAILS—$47 to $50, at works.

OLD RAILS—$27 to $27·50.

SCRAP.—$28 to $31, as to selections.

The sales of Pig Metal have been quite as large, if not larger, than last week. We are quoted the following sales, viz.: 1500 tons No. 1 Foundry at $25 to $26; 5500 tons No. 2 Foundry, at prices kept secret, but said to be below quotations; 2000 tons Gray Forge at from $22 to $23. *Rails.*—Sales include 7000 tons, in lots, for both Eastern and Western deliveries, and include both light and heavy sections. *Old Rails*—1000 tons at $27·50, here. Small sales of Scrap at quotations.

PITTSBURGH.

PITTSBURGH, Sept. 21, 1875.

PIG IRON.—The situation remains substantially the same as noted at date of my last report; there has been no improvement in trade, the mills continue to buy only as their immediate necessities require, and, while prices have undergone no quotable change, the general tone of the market is weaker. The trade generally have been very much disappointed in the course of the market during the past month or more; both producers and commission merchants generally were very hopeful during July and August that there would be an increased trade during September; that the most of the mills would then enter the market and contract for a two or three months' supply; but in consequence of the unsettled and very unsatisfactory condition of the market for Manufactured Iron, their expectations have not yet been realized. It is conceded that stocks of Mill Iron, not only here but in the Mahoning and Shenango valleys, are very much reduced; also, that the production is less now than it has been for several years, but this is offset by the very limited demand, and the apparent determination of the mills to buy only when forced to do so. Quotations: No. 1 Foundry, $27 @ $28, 4 mos.; No. 2, $25 @ $26; Gray Forge, $24; White and Mottled, $22 @ $23.

MANUFACTURED IRON.—There is no improvement to note in the position of the market, and while it is hoped that there soon will be, the outlook at the present writing is not very encouraging. The mills, it is true, are all in operation, but some are almost up with their orders. Business is not what it usually is or should be at this particular time, and in addition to a light run of orders, prices continue unremunerative. Makers of ordinary sizes allege that current rates do not afford any margin for profit. Sometimes trade takes a turn for the better when least expected, and it is possible that we yet may have an improvement before the winter sets in, but the outlook is not very encouraging.

NAILS.—There is a continued fair demand, which is steadily increasing. Some makers report that although working up to their full capacity they are behind with their orders, and as stocks are light both in hands of jobbers and consumers, and prices are down to hard pan, a steady trade is looked for during the balance of the season. It is understood that the Nail Association, at its last meeting, concluded that it was best, for the time being, to allow each firm to make its own price, so that there is no regularity in this respect; however, quotations may be fairly given as $3, 60 days, with 2 per cent. discount for cash, and a rebate of 10c. per keg on all lots of 100 kegs and upward. Horse Shoes quoted steady at 4¾c. per lb., cash, and Mule Shoes, 5¾c., cash.

STEEL.—There is a fair demand for all the leading grades, particularly that used in the manufacture of agricultural implements, and for these there appears to be a firmer feeling, but as yet no actual improvement in prices.

SCRAP IRON.—Trade continues dull, remarkably so for this season of the year, but prices have undergone no recent change; No. 1 R. R. Wrought Scrap, $29 to $30, 4 mos., delivered free at mills.

WINDOW GLASS.—The demand for Window Glass is increasing. Some of our manufacturers report that they are behind with their orders, and as stocks, both in first and second hands, are very much reduced, an early improvement in prices, which is very much desired, is not improbable. Discounts are quoted at 15 and 5 per cent. off Pittsburgh list for car load lots.

The Pittsburgh *Commercial* of Sept. 18 says: We have to report another dull week in raw irons. The sales were confined altogether to lots suitable for mixtures. Notwithstanding the light demand there is evidently no accumulation of stocks either here or at the furnaces. The fact is, there is a wide difference in the views of dealers in regard to the future, hence correct figures are difficult to obtain. Consumers hold to the opinion that prices have not reached their lowest figures, and holders contend that prices are sufficiently low for all reasonable purposes. Business, however, is being done at extremely low margins of profit. It can be said truly that the future does not present a very flattering appearance for iron workers. We are reported the following sales:

BITUMINOUS COAL SMELTED FROM L. S. ORE.

300 tons gray forge	$24·00—4 mos.
300 tons white and mottled	$22·50—4 mos.
200 tons white	21·50—4 mos.
150 tons close gray	22·00—4 mos.
140 tons gray forge	21·00—5 mos.
100 tons gray forge	24·00—4 mos.
100 tons white and mottled c. s	22·00—4 mos.
100 tons gray forge	24·00—4 mos.
100 tons gray forge	24·00—4 mos.
100 tons close gray	23·50—4 mos.
70 tons extra gray forge	25·00—4 mos.
50 tons close gray	22·50—cash.
80 tons close gray	22·50—cash.

CHARCOAL.

240 tons No. 2 foundry, h. r.	$26·00—4 mos.
60 tons No. 1 foundry, h. r.	28·00 @ 32·00—4 mos.
50 tons No. 2 foundry, h. r.	26·00—5 mos.
40 tons No. 1 foundry, h. r.	30·00—4 mos.
30 tons No. 2 foundry, h. r.	28·00—4 mos.

CONNELLSVILLE COKE.

50 tons foundry, mixed	$25·50—4 mos.
20 tons No. 2 foundry	$24·00—cash.
10 tons No. 2 foundry	25·00—4 mos.

ANTHRACITE.

100 tons white and mottled	22·50—4 mos.

BLOOMS.

10 tons Missouri charcoal	$70·00—4 mos.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Sept. 11, writes us as follows: The market for the past week has been moderately brisk, but operations have been almost wholly confined to No. 1 Foundry Charcoal and Mill grades. Prices are exceedingly low, and the tone of the market very little if any firmer than heretofore. The usual time, four months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$25·00 @ 26·00
" 2 " " " "	23·00 @ 24·00
" 1 Mill, " " "	22·00 @ 23·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00

HOT BLAST STONE COAL AND COKE.

No. 1 F'dry, from Hanging Rock Ores	$23·00 @ 24·00
" 2 " " " "	22·00 @ 23·00
" 1 Mill, " " "	21·00 @ 22·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00
No. 1 F'dry, from Missouri Ores	24·00 @ 25·00
" 2 " " "	24·00 @ 25·00
" 1 Mill, " " "	26·00 @ 27·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	35·00 @ 40·00
" " Tennessee Ores	28·00 @ 30·00
" " Alabama and Georgia Ores	28·00 @ 30·00
Car Wheel from Kentucky Ores	28·00 @ 40·00

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of Sept. 14: Really good Wheel Irons continue in active demand, and prices are very firm at quotations. Favorite brands having been sold up are disappearing from the market. Considerable stocks of new brands are awaiting purchasers at reduced prices:

Virginia cold blast Charcoal Pig Irons	$30·00 @ 35·00
" hot " "	28·00 @ 32·00
Va. hot blast Coke Pig Iron, No. 1 ex.	26·00 @ 27·00
" " " " No. 2 ex.	25·00 @ 26·00
" " " " No. 3 ex.	24·00 @ 25·00
Virginia Anthracite No. 1 ex	27·00 @ 28·00
" " No. 2 ex	26·00 @ 27·00

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Sept. 20, write us as follows: The market appears quiet, with no transactions of importance to report. Although prices are still within the limit of our quotations, they probably in some instances range nearer to inside figures. We note a good demand for Mill grades, without change in prices. At the present time it is very difficult to predicate as to the future, but indications are that no great fluctuations can be anticipated during the next few months.

HOT BLAST CHARCOAL.

Hanging Rock No. 1, ₱ ton	$26·00 @ 27·00—4 mos.
" " No. 2	24·00 @ 25·00—4 mos.
" " Forge	23·00 @ —4 mos.
Virginia No. 1	25·00 @ 26·00—4 mos.
" No. 2	23·00 @ 24·00—4 mos.
" Forge	22·00 @ 23·00—4 mos.
Southern Brands No. 1	24·00 @ 25·00—4 mos.
" Forge	22·00 @ —4 mos.
Missouri No. 1	26·00 @ 27·00—4 mos.
" No. 2	24·00 @ 25·00—4 mos.

HOT BLAST STONE COAL.

Ohio No. 1, ₱ ton	$24·00 @ 25·00—4 mos.
" Forge	21·00 @ 26·00—4 mos.
Am. Scotch, No. 1	25·00 @ —4 mos.

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel ₱ tn.	$35·00 @ 40·00—4 mos.
Missouri " "	35·00 @ 40·00—4 mos.
Southern Br'ds " "	30·00 @ 40·00—4 mos.
Machinery and Forge	30·00 @ 35·00—4 mos.
Blooms	70·00 @ 90·00—4 mos.

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of Sept. 16, report the Iron market as follows: We have nothing new to report from this market the past week. Trade is still dull, and buyers are all seeking low prices. Demand light. We quote as follows, on four months' time:

Mo. Stone Coal, No. 1 F'dry.	$27·00 @ 28·00—4 mos.
" " No. 2 F'dry.	25·00 @ 26·00—4 mos.
" " No. 1 Mill	23·50 @ 24·00—4 mos.
" Charcoal, No. 1 F'dry	27·00 @ 28·00—4 mos.
" " No. 2 F'dry	25·00 @ 26·00—4 mos.
" " No. 1 Mill	23·50 @ 24·00—4 mos.
Tenn. Charcoal No. 1 F'dry.	26·00 @ 27·00—4 mos.
" " No. 2 F'dry.	25·00 @ 26·00—4 mos.
" " No. 1 Mill	24·00 @ 25·00—4 mos.
Georgia Coke No. 1 Mill	25·00 @ —4 mos.
" " No. 2 Mill	24·00 @ —4 mos.
H. R. Charcoal No. 1 F'dry.	27·00 @ 29·00—4 mos.
H. R. " No. 2 F'dry.	25·00 @ 27·00—4 mos.
H. R. " No. 1 Mill	25·00 @ 26·00—4 mos.
Massillon, A No. 1 Iron	35·00 @ 36·00—4 mos.
" B, No. 1 Iron	32·00 @ 33·00—4 mos.
" No. 2 Iron	30·00 @ 31·00—4 mos.
Cold Blast Car Wheel, Mo.	32·00 @ 35·00—4 mos.
" " Tenn.	32·00 @ 35·00—4 mos.
" " Ala.	33·00 @ 35·00—4 mos.
" " Hanging Rock	50·00 @ 53·00—4 mos.
No. 1 Wrought Scrap	1c. per lb.
Heavy Cast "	9·10c. "
Light Cast "	5·10c. "

BOSTON.

SEPT. 18.—*Pig* has had a little ripple of business in the sale of a few odd lots of Foundry Iron, enough to meet the pressing wants of a few small furnaces. The report of a purchase of 5000 tons extra Gray Forge, f. o. b. in New York, by leading forges, is credited here at $20·50. We quote nominally No. 1, $29 to $30; No. 2, $24 to $27; and Gray Forge, $21 to $24. *Bar* has had a little better business than a week ago, with jobbers feeling possibly a trifle stronger. The failure of the week does not throw any noticeable lots upon the market. Quotations range from $58·50 to $60, with the outside price occasionally obtainable on odd sizes. Common iron is very listless, quoting from $51 to $53. *Steel* continues to sell with a better tone to machinery. We quote: American Tool, 14c. to 15c.; American Machinery, 9c. to 9½c.; do. Cash Tires, 8½c. to 12½c.; Sweet's Excelsior Tire, 7c. to 7½c.; English Tool, 16c. to 18c. *Copper* is selling in a trivially better way, the manufacturers still buying in the most economical way. Prices remain steady at 23½c. for spot, futures asking, without takers, 23¾c. For manufacturers' wire we quote: New Sheathing, 30c.; Bolts and Braziers, 31c. *Lead* is still very dull and quite disappointing to holders, who have stood up to the rack with a heavy stock and no market for the past seven months. Prices are nominally strong. We quote Pig 6c. for Domestic, and 6⅝c. to 6¾c. for Foreign; Sheet and Pipe Lead, 9¼c., currency; Tin Lined Pipe, 16½c.; Bar Lead, 6½c., less usual trade or 10 per cent. discount. *Antimony* is firm, with very little business, quoting from 13c. to 13½c. as to lots bought. *Spelter* is strong and dull at $7·55, 30 days, and $7·40, prompt cash, all currency. Silesian is having a trivial business at $7·30. *Tin* is very quiet for Pig, while plates are a trifle more active and somewhat firmer. We quote Straits, 18¾c. to 19c.; Banca, 23c.; Refined English, 18¾c. to 19c., gold. Plates are active; we quote Charcoal I. C., $9·50 to $10; Coke, $7·75 to $8; and Terne at $7·50 to $11, gold.—*Com. Bulletin.*

CLEVELAND.

Messrs. C. E. BINGHAM & Co., 25 West Main street, under date of Sept. 20, quote the Iron market as follows, 4 mos. time:

FOUNDRY IRON.

No. 1 Lake Superior Charcoal	$31·50—4 m.
No. 2 " "	30·50—4 m.
No. 1 Anthracite	28·50—4 m.
No. 2 "	27·00—4 m.
No. 1 Bituminous	28·00—4 m.
No. 2 "	26·50—4 m.
No. 1, Cherry Valley Am. Scotch	31·00—4 m.
B—1 " "	28·50—4 m.
No. 2, " "	27·50—4 m.
No. 1 Massillon	30·50—4 m.
B—1	28·00—4 m.
No. 2	25·50—4 m.

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	$30·50—4 m.
No. 4 " "	32·50—4 m.
Nos. 5 & 6 " "	33·00—4 m.

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	$31·00—4 m.

FORGE IRON.

No. 1 Gray	$24·75—4 m.
White and Mottled	23·50—4 m.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of Sept. 21: This market remains much in the same condition as reported for the past two or three weeks. Trade continues ruling moderately fair, with unaltered list.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	2·6-10 to 2 7-10c. ₱ lb.
1 to 4½ wide by 1½ to 2 thick	"
Round and square, ordinary sizes, from ⅜ to 2 inclusive	2 6-10 to 2 7-10c. "
Hoop Iron, 1½ wide and upward	4½ to 4¾c. "
Band Iron, from 1¼ to 4 in. wide	3¾ to 3¾c. "
Horse Shoe Iron ⅜ to 1 wide by ⅜ to ½ thick	4 to 4¼c. "
Norway Nail Rods	7 to 7¼c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	15½ to 16c. "
Machinery Steel	11 to 11½c. "
Cast Spring Steel	10 to 10½c. "
Homogeneous Steel Plate	10½c. "
Perkins' Horse Shoes, per keg of 100 lbs.	$5·12½
" Mule Shoes " "	6·12½

Common Horse Nails, from 14c. to 18c. per pound.

10	9	8	7	6	
Putnam Horse Nails	24	25	26	28c.	per lb.
10	9	8	7	6	
Globe Horse Nails	24	25	26	28c.	per lb.

R. R. Spikes, 5¼ by 9-16 at 3c to 3¼c. per lb.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of Sept. 20: The Anthracite Iron market continues dull and depressed, and prices decidedly favor buyers. Charcoal Irons of good brands are in fair demand, but no change in prices—the supply being fully equal to the demand. We quote:

Baltimore Charcoal	$31·00 @ 35·00
Virginia "	29·00 @ 34·00
Anthracite No. 1	25·00 @ 26·00
" No. 2	23·00 @ 24·00
" No. 3	21·00 @ 23·00
White and Mottled	20·00 @ 21·00

FOREIGN.

FRANCE.

(Monitteur des Interets Materiels.)

PARIS, September 5, 1875.—*Metals.*—The month of August has been a tolerably favorable one in the metal line. Under pressure of a precipitate demand on the part of operators for a decline, who during several months had so adroitly managed to depress prices, the metal markets have promptly responded to this sudden inquiry, and the animation resulting therefrom neither the English and American failures, nor a somewhat tighter money market, have been able to check. The situation remains a sound one, at least as much so as could have been wished for at this season of the year, when the fall trade has not yet fully developed. As regards *Copper*, in particular, the diminished shipments from Chili have been principally instrumental in imparting firmness to the metal. Manufacturers have also approached with some fresh commands, and, although their articles have not yet improved much, they at least, show a good deal of firmness. The entire improvement during the month in England has been between £3 and £4, but at the close the larger amount of charters on the West Coast of 3000 tons during the second half of August has produced a less confident feeling. The French markets have been steady. We quote here: Chili Bars, deliverable at Havre, 217·50; Common ditto, 214; Ingots, 225; English Tough Cake, 222·50; and pure Corocoro Ore, 217·50. Havre quotes: Chili Bars, 216·25 to 217·50; Refined ditto in Ingots, 222·50 to 227·50; pure Peruvian Ore, 215; Lake Superior, 235, and old Copper 205 to 210. Marseilles quotes firm prices on the basis of 215 for small Ingots. *Tin.*—The improvement of £4. 10/ in the London market in August was due to the expected large deliveries, and these anticipations have been fully realized, there having gone out of stock 1200 tons in England and 720 in Holland, but the arrivals have also been on a most liberal scale, but will now fall off for some time to come; hence the favorable tendency still observable both at London and on the Continent. The French markets evince much firmness, and our own quotations are the following: Banca, deliverable at Havre or Paris, 232·50 francs; Straits here, 216, and English, at Havre or Rouen, 220. At Havre, Banca commands 225 to 230, and Straits, 210 to 215. Marseilles is steady on the basis of 210 for Straits and Billiton. The course of *Lead* has been a steadily upward one, notwithstanding the news from Spain that several new mines are to be taken in hand immediately. In August the metal improved altogether some 15/ per cwt. in the London market, and in proportion as much on the Continent. All this has been brought about by the demand for army purposes, joined to consumptive inquiry. We quote on a firm market here, French, 58·50; Spanish, deliverable at Havre, 58·50; English there, 59, and Belgian and German here, 59. Soft Spanish at Havre is bringing 55 to 56. Marseilles is firm at 54. *Spelter* has also been steadily advancing, and the European markets present a strong appearance. Sheet Zinc is also rising. Some Australian Spelter recently arrived at London and sold at £17. Here the market has been quite firm, with a rather increasing demand. We quote Silesian, deliverable at Havre, 64·50, and other good brands at Havre and Paris, 64. Havre quotes 64; Marseilles unaltered. *Iron.*—Neither the approaching fall trade, nor the satisfactory harvesting, nor the large tax collection, which shows prosperity to an unexpected degree, have as yet given a vigorous impulse to the Iron and machinery trades, which remain comparatively dormant. Activity is restricted to the filling of small orders of a variety of patterns. Pig Iron is quoted 70 francs in the Meurthe and Moselle, but in reality sells at 67; at Luxembourg, 58, selling at 55. Experiments continue to be made by the Pernot furnace process, but it is still doubtful whether it is preferable for Iron or for Steel. *Coal* has been active; greasy in the Pas de Calais, 30 to 32; lean, 18 to 20, which show an improvement.

BELGIUM.

(Revue Universelle).

BRUSSELS, September 5, 1875.—*Iron.*—The accounts from England, Germany and the Grand Duchy report firmer markets, and large sales to be impending. In consequence of this somewhat improved aspect, the opening of tenders for the disposal of old government rails has proved a decided success, ranging between 88 and 98·50 francs. Steel rails are more thought of daily in various parts of the Continent; thus the Northern Railroad of Spain, reports very favorably, and insists that repairs have lessened considerably, and saved much money. Mr. De Camphausen, Secretary of the Treasury of the German Empire, has been firm in discouraging the appeal from German Iron and Steel manufacturers which endeavored to prevent the abolition of import duties. The discussion about the alleged inferiority of Belgian Steel continues in England, but our country is ably represented there, and proof in hand every one of these ridiculous assertions is demolished by men who know what they write about. A meeting has taken place at Strasbourg, Alsace, of Iron and Steel manufacturers, the majority men who have adopted the bastard theory of being neither free-traders nor protectionists, but have nevertheless voted in favor of trying to delay the introduction duty free of Pig Iron, Merchants' Iron and locomotives into Germany to date from the 1st of January, 1876. *Coal.*—Production having been checked of late, our companies find no difficulty in disposing of their available supplies, moderate as they are, and as industrial activity has been looking up, the prospect ahead is a fair one. Coal seems low enough at present, in fact it hardly can decline any lower without reducing wages, unless some new machinery for extracting it from great depths be invented.

GERMANY.

(Borsenhalle.)

HAMBURG, Sept. 4, 1875.—*Metals.*—Although business has not yet quite developed its usual autum activity, metals have, on the whole, been doing tolerably well, due to the impetus emanating from neighboring countries. The political troubles in the East of Europe have exercised a favorable influence on most of the metals, inasmuch as some governments have been forced into the market which had been delaying their purchases of Copper, Spelter, Lead, etc. This accounts for the steadily upward course pursued by these metals in August. *Copper.*—Berlin has been steady at 89 to 92 marks the 50 kilos for English and Australian, and 92 refined Mansfield. The market here has been firm; Russian Drontheim at 94, Minnesota, 110, and Chili Bars at 89 marks. A steady feeling is also reported from Stettin, on the basis of 93 marks for Swedish. *Tin.*—The German markets have been more or less rated by those of London and Holland, and the upward tendency maintained, with a moderate amount of trade. The quotations here have remained within the range of 94 to 98 marks. Stettin is sustained at 98; Berlin 92·50 to 93 for Banca. *Lead.*—The scantiness of an available supply has been felt throughout, and prices have risen corresponding wherever the demand for consumption has proved imperative. Berlin is firm at 24·60 to 23·25. Here we quote as follows: English, 25·50 to 26; German 23·75 to 24·50; and Spanish, 25 to 25·50. English White Lead, 33; Dutch, 34·50 marks. *Spelter* would have been more active but the supply is deficient in quantity. Berlin quotes 24·50 to 25·50; Breslau, common, 23 to 23·10; W. H., 23·15 to 24; Godulla, 23·25; Stettin, 24 to 25. We are here at 25, and firm.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, Sept. 9, 1875.—*Tin.*—Banca during the past three weeks has been in active demand, the price advancing from 48 to 52 guilders, at which there are now sellers. September contracts close at 51½. *Copper* is firm at 51 to 52 guilders for Russian. *Lead* has been well sustained at 13¾ for Stolberg, 13 Spanish, and 13 guilders the various German Brands. *Spelter* is steady at 13 to 13¾ for Silesian.

CHINA.

(Arnhold, Karberg & Co.)

CANTON, Aug. 13, 1875.—*Metals.*—*Lead.*—Only a retail business has taken place during the past fortnight, and it has been entirely confined to re-sales by native speculators at $7·80 to $7·85 for L. B. The small stocks in first hand are firmly held for quotations. *Tin* must be quoted 25c. per picul lower, but a fairly active demand prevails at the rates now current. *Quicksilver.*—Holders have continued to meet the market readily, and a further decline has been the result. The last sale has been effected at $98 per picul for immediate clearance. We quote *Lead* $7·65 to $7·95 per picul; *Tin*, $21·25 to $23·75; and Quicksilver, Spanish, $100 to $101; California, $101 to $103. *Exchange* on New York, 5 months sight, 4½ per cent discount.

EAST INDIES.

(Schmidt, Kustermann & Co.)

PENANG, July 26, 1875.—*Tin.*—Prices have gradually declined in sympathy with lower quotations reported from London. During the earlier part of the four weeks under review purchases were made at $22 to $21 per picul for unsmelted, but shortly after departure of last mail a slight reaction took place, and the metal was paid $21·65 per picul. This price could, however, not be maintained, and dealers had to accept again $21·50, and latterly, $21·40; down to $21·20 per picul. There are about 2000 piculs left unsold in the market.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, ENG., Sept. 6, 1875.

THE STATE OF TRADE

has not materially altered since I wrote last week. Pig iron has hardened, it is true, in almost every district, but, I think, mostly in consequence of the upward tendencies of the Scotch makers' prices. The finished iron departments are everywhere badly off for work, although in one or two localties a very respectable business is being done in boiler and ship plates and singles sheets. The industries of South Wales do not appear to revive in any appreciable degree, and the coal trade of that principality is likely to come to a deadstand, owing to the quarrel between Mr. Alexander M'Donald, M. P., and Mr. Hussey Vivian, M. P., both members of the newly formed Arbitration and Conciliation Board. Mr. Vivian, who is the masters' representative has, asserted that the recent speech of Mr. M'Donald's declaring the employers to be cruel, grinding tyrants, &c., &c., is a personal insult, and that he could not consent to act with M'Donald unless an apology were tendered. As everybody who knows the fiery Alexander would naturally expect, he has declined to make any apology, whereupon Mr. Vivian has sent in his resignation (as the Arbitration Board representative) to the associated masters. This, I learn by telegraph to-day, the masters refuse to accept, so that matters are now evidently at a deadlock. In the rail trade all over the country things appear to be going from bad to worse, if that can possibly be under existing circumstances. At Barrow a lock-out has this morning commenced, owing to the rail and hammer men of the Barrow Steel Company having declined to accept a reduction of five per cent. in wages. These works are not now nearly so well employed as they had been previous to a couple of months back.

OUR RAILWAY ACCIDENTS.

From a Parliamentary return, published yesterday, it appears that during April, May and June, in the present year, there were in the United Kingdom 461 railway accidents of all kinds, involving death to 251 persons and injury to 1170. Of passengers 23 were killed and 314 injured—all but two of the killed and nearly half of the injured through their own fault. Of 157 servants killed, only five suffered from causes beyond their own control, and 99 only out of 776 injured. "Other persons" show a total of 81 killed and 80 injured. Level crossings figure for 23 deaths, and trespassers and suicides for 48. These figures, it must be confessed, look very formidable when it is seen that they only refer to three months of the year. Next quarter's return will be worse still, seeing that on Saturday week there were five or six accidents, in one of which 7 persons were killed and about 50 more or less badly injured. Yet Sir John Hawkshaw jauntily and airily informed his auditory at Bristol, the other day, that the dangers of railway traveling were very shadowy indeed—in fact, practically speaking, you were probably safer in a railway carriage than elsewhere! I am not, I will just venture to remark, a very firm believer in the Mr. Filer school of statisticians, yet I prefer, "on the present occasion," to pin my faith to the figures quoted above, rather than place credence in the assertions of the eminent engineer to whom I have referred.

THREE MONTHS' FAILURES.

A few days back the London *Times* published a table giving the results of the failures of the past three months, so far as can be ascertained from the published balance sheets. The list is not so complete as the one I compiled for *The Iron Age* a couple of months ago, but it shows how the liabilities have "run off" in several instances:

	Liabilities.	Assets.
Gilead A. Smith & Co.	£411,381	£20,212
E. Corry	172,770	74,328
A. & M. Zimmerman	49,773	21,004
A. Collie & Co.	1,889,786	*802,392
Shand & Co	341,980	38,368
Rainbow, Holberton & Co.	61,515	6,336
John Anderson & Co.	144,747	31,796
John Strachan & Co.	96,938	5,711
J. C. Fowlie	121,638	10,704
Alexander, Sons & Co.	240,585	34,254
Adamson & Sons	94,293	12,917
J. P. Westhead & Co.	318,000	302,000
R. Benson & Co.	124,331	70,000
L. Stewart	32,821	11,363
Wilson & Armstrong	238,531	57,090
C. Carnie	56,000	1,050
S. & J. Graham	71,606	22,943
Laing & Irvine	173,000	70,000
Rutlall & Sons	128,605	18,015
E. Jones & Co.	102,898	54,235
Da Costa, Rasite & Co.	265,580	85,200
Kilburn, Kershaw & Co.	201,476	6,577
John Ranking & Co.	106,898	†38,392
Lambert Brothers & Scott	170,818	95,906
R. Corkling & Co.	149,000	41,000
Schulze & Mohr	142,524	7,972
W. Walker & Co.	130,000	70,000
Whitlock & Dadson	146,000	5,000
Shaw & Thomson	103,177	152,363
	£6,306,656	£2,087,018

* Of which £551,850 is doubtful.
† " 26,900 "
‡ " 15,510 "

THE TRADES UNION CONGRESS,

to take place at Glasgow on October 11th, and following days, is likely to be uproarious. Already some of the principal societies, including the new National Miners' Association, have decided that they will not send representatives to it, seeing that the representation is so unequal and the proceedings frequently so farcical. The programme for the congress embraces "legislation" on the following points:

1. Criminal Law Amendment Act; 2. Master and Servant Act; 3. Laws of Conspiracy; 4. Trades Union Act; 5. Compensation to workmen; 6. Composition and payment of juries; 7. The summary jurisdiction of magistrates; 8. The appointment of and administration of law by qualified and unqualified magistrates; 9. The Small Penalties Act; 10. Workshops Regulation Bill, and women working in brickfields; 11. Truck Act; 12. Merchant Shipping Bill; 13. Representation of labor in Parliament; 14. Appointment of inspectors under the Factories and Workshops Act, and the Mines regulation Acts; 15. Arbitration in trades disputes; 16. The Patent Laws; 17. The "Sweating System."

The propositions put forward for the new constitution of the Congress run in this wise:

1. That no delegate have a constituency of less than 300 *bona fide* members.

2. That societies with 300 members, and up to and including 2000 members, be allowed *one* delegate

3. That societies with over 2000 and under 5000 members be allowed two delegates.

4. That societies with 5000 and under 10,000 members be allowed three delegates.

5. That societies with over 10,000 members be allowed one additional delegate for every 5000, or part of 5000, additional members.

6. That societies with less than 300 members be allowed to group themselves together, either locally or nationally, so as to make the required number of constituents, for the purpose of sending a delegate.

7. That branches of societies be represented only in the event of the general body to which they belong not sending a delegate; in such case, branches may send delegates subject to the foregoing rules as to numbers and grouping.

8. That Trade Councils be allowed to send representatives only for such societies as may not otherwise be specially represented in any other form. In which case they will have to comply with the rules as to numbers and grouping embodied in the foregoing rules.

9. That societies represented at the Congress contribute to the expenses of the Parliamentary Committee annually at the rate of not less than one farthing per member to carry on the work entrusted to it by the Congress.

These propositions, I apprehend, will furnish grounds for vehement discussion, and, I surmise, violent disputes. It is, at any rate, certain that reform is very much required, or the Congress will remain a mere absurd and time-wasting burlesque of what it ought to be.

AMERICAN EXPERIMENTS IN STAFFORDSHIRE.

I extract the subjoined report from the Birmingham *Post*, of September 3d, as being of interest to Mr. Rogers' friends and your trade generally:

"Several mill and forge managers, representing the leading finished iron works in South Staffordshire, have just met, by invitation, at the Bull Bridge Iron Works of Messrs. Molineux & Co., at Moxley, to see the results of experiments in their early stages with the process of puddling iron by the aid of blast. The process is one which has excited much curiosity, and has been attended with great success at the works of Messrs. Rogers & Burchfield, at Leechburgh, in Pennsylvania, and Mr. Rogers himself was present. The blast is injected at the top of the furnace by four tuyeres, and it impinges upon the flame immediately it comes over the bridge from the grate, where it acts like one great blow-pipe. The intense heat shortens the process of puddling by from fifteen to twenty minutes, and very greatly improves the quality of the metal produced as compared with the quality obtained from the same class of pig without the blast. The managers watched a heat made, examined specimens of the iron which had been rolled and tested, and received from Mr. Molineux a statement of the average yield secured both without and with the blast. One workman had worked fifteen heats without the blast and fifteen with it, with the result that the yield was less with the blast than without it by 1 cwt. 2 qrs. upon the fifteen heats. Another and a better workman had worked seventeen heats with and seventeen heats without the blast, with the result that in his case more was produced with the blast by 3 qrs. 11 lbs. In both instances, however, the quality obtained

with the blast was greatly superior to that obtained without it, though the fuel used in both was about the same in kind and quality. From the mixtures of pig iron used to make the usual quality of sheets of the singles gauge, sheets were produced equal to those which had heretofore required the employment of a very superior pig iron. The sheets had been stamped into Lowls and trunks, and had also been galvanized. The process enabled Barrow iron, which is commonly red short when worked by itself, to be rolled into sheets of a thin gauge, without displaying any of the red-short evidences which had before attended the manipulating of that iron at the same works without the blast; but the somewhat heavy loss in yield with this class of iron was still apparent. It was explained that what had already been done would be followed up by the application of the tuyeres to other furnaces, and by the use of other mixtures; and Mr. Molineux said that he was satisfied with the results hitherto attained, and expressed his belief that further experiments would bring about progressive improvements in all respects. He had, he said, been greatly pleased with the candid and disinterested manner in which Mr. Rogers introduced the subject to his notice. Mr. Rogers had said: 'I have obtained certain striking results in America, and I want to know if the same cannot be got here. If you like to make the experiments I will give you my help; and if they don't succeed I will defray any extra cost to which you may be put.'"

The visitors spoke their warm obligations to Mr. Molineux and Mr. Rogers for the opportunity they had afforded them of seeing what was being done at this initial stage in the tests to which the principle is being put at the Bull Bridge Works, and expressed their interest in the further experiments upon which Mr. Molineux was entering. It was generally admitted that it was impossible by the old hand process to produce with the same mixtures of pig sheets of the quality which were turned out by the aid of the blast.

Mr. Rogers, addressing the visitors, said that the application of the blast at the top of the furnace had proved a big thing in America, and he wished to learn by actual experiment if the same results could be attained in England. So excellent had been the issue in America, that, notwithstanding it had been widely stated that it was impossible to make tin plates of American coke iron, he was now doing it from the ordinary Lucy pigs. They were so named after the furnace in which they were made. From this iron he was producing tin plates which were as good as those got in the customary way from charcoal pigs. He knew something about charcoal iron, for he had seven charcoal furnaces at his works. That the coke sheets made with this blast were equal to charcoal he found by sending some to customers, who usually bought charcoal sheets from him. He mixed the two, and the consumers in using them could not tell by the results which were charcoal and which were coke, both being equally excellent. Again, he had sold puddled coke iron to a firm in New York, and that firm had preferred it to charcoal iron, explaining that it was more uniform in its quality. He was likewise a large producer in America of iron for stamping and galvanizing. One order upon the books of his firm was for five thousand bundles of sheets to be galvanized and stamped into mantlepieces, and cornices and the like, all of which required a very good quality to bear the stamping to which it was subjected. Yet this quality he was able easily to produce from Lucy coke pig by the use of the blast. His men were partial to the invention; and well they might be, seeing that by using the blast they could, with less labor, get out five heats in the time hitherto required to complete four.

THE SCOTCH PIG IRON MARKET

was rather stiffer during the greater part of the week just ended, and warrants at one time reached 64/10. This was on the Wednesday afternoon, but next day a slight relapse set in, and during the remainder of the week a lower tone prevailed. There was, nevertheless, an advance in several brands of makers' irons, as will be seen by the appended quotations, which did not prevent a good shipping business being effected. Freights are unchanged, as also is the price of ballast pig iron. There are at present 114 furnaces in blast in Scotland, as against 112 at the corresponding period of last year. Connal's stores contain 48,801 tons—an increase for the week of 4485 tons—and 28,300 more than at the same date in 1874. In the face of this heavy storage I do not believe it to be likely that prices will go up, if, indeed, it is possible to maintain them at the present level.

Writing from Glasgow, on the evening of September 3, Messrs. James Watson & Co. said: "The warrant market opened lifeless this week at 64/3, cash, but advanced to 64/9 on Wednesday, consequent upon advances on makers' quotations. Since then price has receded to 63/10½, cash, closing thereat. Shipments last week were 10,232 tons, against 8751 tons in the corresponding week of 1874."

	No. 1.	No. 3.
G. M. B., at Glasgow	65/	63/6
Gartsherrie, "	73/	64/6
Coltness, "	75/6	65/6
Summerlee, "	66/6	63/6
Langloan, "	74/	64/6
Carnbroe, "	66/6	63/6
Calder, at Port Dundas	71/6	63/6
Glengarnock, at Ardrossan	69/	64/
Eglinton, "	64/6	63/
Dalmellington, "	64/6	63/6
Shotts, at Leith	73/	64/6
Kinneil, at Boness	63/6	61/

Messrs. Wm. Colvin & Co. (Glasgow, Sept. 7) report thus: "The warrant market was very steady all last week, with business done from 64/9 to 64/, cash, closing on Friday with sellers at the latter price. On Monday the tone was not so firm, the price ranging from 63/6 to 63/. To-day there has been a more active demand, and the price advanced from 63/3 to 63/9, closing with buyers at the best, sellers asking 64/, either for cash or one month open, and 63/9 one month fixed. The undernoted quotations for makers' iron show very trifling alterations on those of last week. There is still an extra demand for one or two special brands, but there is no pressure for ordinary iron, which has lately gone freely into store. The quantity of iron against which warrants can now be issued amounts to 55,000 tons. The Middlesbrough market is reported firmer to-day, 58/ paid for No. 1, and 53/ for No. 3, for immediate delivery.

Deliverable alongside.

	No. 1.	No. 3.
G. M. B., at Glasgow	64/6	63/
Gartsherrie "	72/6	63/6
Coltness, "	75/6	65/6
Summerlee, "	66/6	63/6
Langloan, "	74/	64/
Carnbroe, "	65/6	63/6
Monkland "	65/	63/
Clyde "	65/	63/
Govan, at Broomielaw	65/	63/
Calder, at Port Dundas	72/6	64/
Glengarnock, at Ardrossan	69/	64/
Eglinton, "	63/6	62/6
Dalmellington, "	64/	63/
Carron, at Grangemouth	65/	..
Carron, " specially selected	67/6	..
Shotts, at Leith	73/	65/
Kinneil, at Bo'ness	63/6	61/
Bar Iron	£8. 0/ to £8. 10/	
Nail Rods	£9. 0/.	

SHIPMENTS.

	Tons.
Week ending Sept. 4, 1875	10 616
" Sept. 5, 1874	9,483
Increase	1,133
Total increase for 1875	90,837

Messrs. John E. Swan & Bros.' (limited) prices current gives the following:

Glasgow Brands.	Furnaces Blowing, 114	Furnaces Out 34.	Furnaces Built, 157.	Prices. No. 1.	No. 3.	No. 4
Gartsherrie	13	3	16	72/6	64/	..
Coltness	12	0	12	75/	65/6	..
Summerlee	6	1	8	66/	63/	63/
Langloan	7	0	8	74/	64/	64/
Govan	4	0	5	64/6	63/	62/
Calder	2	2	8	72/	63/	64/
Shotts Bess'mer	5	1	6½	80/	..	..
Shotts Ordinary				73/	65/	64/
Carnbroe	4	2	6	66/	63/	63/6
Wishaw	2	1	3	..	..	..
Monkland	9	0	9	64/6	63/	60/
Chapelhall				..	..	..
Clyde	5	0	6	65/6	63/	61/
Quarter-Clyde	4	1	6	64/6	63/	61/

*f. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b., 63/9.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

Glengarnock	7	2	9	68/6	63/6	65/6
Ardeer	4	1	5			
Eglinton Brand'd	6	2	8	64/	63/	64/
Eglinton	4	0	4			
Muirkirk Brand'd	3	0	3			
Portland Eglint'n	3	3	6			
Dalmellington	6	2	8	64/	63/	60/

EAST COAST BRANDS—*f. o. b. in the Forth.*

Kinneil	3	1	4	63/6	60/	58/6
Almond	2	1	3	63/6	60/	59/
Carron Select'd	3	3	6½	67/6	..	..
Carron Ordn'y				65/	..	..
Lochgelly	0	4	4	..	60/	..
Lumphinnans	0	3	3	..	..	..
Bridgeness	0	2	2	..	..	..

TRADES OF SHEFFIELD.

In some quarters there is just now an evident disposition to believe that an improvement has come about as regards certain branches of the local iron trade, and that as the autumn grows this amelioration will be more appreciably felt. Other manufacturers, however, fail to perceive the force of this hopeful view of the situation, and declare that they are now fully as badly off for orders as they have been any time this year.

It is, at any rate, certain that ordinary pig iron is firmer in price and that producers are inclined to ask more money for very short dated forward contracts. It is, of course, possible that the renewed firmness of the Scotch pig iron market may have had this effect, but if the Glasgow advance has been brought about by the efforts of speculators, as is asserted, it would appear that a relapse must shortly take place. Last week some of the leading makers of best Yorkshire iron announced a drop of £2 per ton off boiler plates and £1 off bars. This reduction applies more particularly to Lowmoor iron, the leading figures for which are now: Lowmoor bars, round, flat or square, £21 per ton; boiler plates, up to 2½ cwt. each plate, £24. 10/; railway tires, either weldless or welded and blocked, £22 to £22. 10/; axles with collars or made to special drawings, £22 to £22. 10/; double crank axles for locomotives, forged, £52. 10/ to £53; rough turned, £63; and finished, £108, all at the works, near Bradford. It should not, however, be inferred from this that common Derbyshire and Yorkshire merchant iron is cheaper or likely to become so if one may place full credence on what the producers of that class of iron allege. They state that quotations for common merchant bars—£7. 15/ to £8. 2/6, at the works—are already at the very lowest possible limit, and that, as a solid and plain matter-of-fact statement, there is really no profit attendant upon making the iron and selling it at these low figures. Should pig iron grow any dearer they must put up prices in order not to incur a positive loss, and if they cannot then force sales the consequence will be that their works must stand for a time.

So far as hematite pig iron is in question, there is so restricted a demand that sales are very limited, at about the following leading quotations: Maryport, hematite, No. 3 77/6; No. 4 77/6; No. 5, mottled and white, 77/6; Bessemer, No. 1, 80/; No. 2, 77/6, and No 3, 77/6, all per ton. Millom Bessemer, No. 1, 80/; No. 2, 77/6, and No. 3, 75/; ordinary, No. 3, 75/; No. 4, 74/; No. 5, 75/; mottled, 80/, and white, 75/, all per ton, with the usual allowance for cash. The Bessemer steel trade remains very quiet, owing to the almost general inactivity of the local and districts rail mills. A small quantity of Bessemer steel is being used for cutlery and other purposes, but in these instances a little steel goes a long way. Bessemer, rolled from what are termed sawn middles, at £7. 5/ to £7. 10/, and then retailed at £13 per ton, is the quality generally used by the cutlery manufacturers and other light hardware manufacturers, who had always, up to very recently indeed, previously made use of common cast steels.

The cast steel manufacturers as a body are anything but busily engaged, but most of them are able to find their workmen three or four days' work per week on single shifts, either on orders or for stock. Two or three of the oldest firms have good commissions in hand for their special classes of tool steel for regular home or foreign customers. At one large establishment of this class I hear that large quantities of Swedish iron of the best quality are being rolled into nail rods for an eminent Leeds firm which has adopted a patent American horse nail manufacturing machine. This machine has, I believe, been fully tested by the firm, and having proved quite equal to the expectations which had been formed of it, is now in steady operation under the superintendence of a gentleman from the other side of the Atlantic. The nails are made in great quantities daily by the machine, and are said to be fully as shapely, tough and serviceable as any that could be made in the old-fashioned manner by hand.

It would seem to be within the bounds of probability that we may presently have a strike of colliers on a large scale in this district. The adjourned conference between the finance committee of the South Yorkshire and North Derbyshire Coal Owners' Association (Mr. Chas. Markham, Staveley, chairman) and a deputation from the Miners' Association, headed by Mr. John Normansell, took place at Sheffield on Monday. The deputation stated that they were not empowered by their constituents to concede any reduction at present, and they had to ask that the arrangement which had been in force during the past four months should be continued forward by both sides for a further period of three months. This reply practically amounted to a refusal to accede to the masters' demand for a drop of 10 per cent. The coal owners adjourned for a week, when they will determine what course to pursue. If they persist, I am afraid the men will resort to a general strike. Earl Fitzwilliam, having again been importuned by his late workmen either to reopen the Low Stubbin Colliery or submit to arbitration, has replied that he will not reopen the pit, and, further, that he "would never entertain the idea of arbitration between himself and his workmen who are always at liberty to leave his service (on giving proper notice) if they are dissatisfied!" The annual report of the directors of the Staveley Coal and Iron Company, Limited, is a very favorable document at this juncture. The year's profits are £138,760, making with £32,111 brought forward, a total of £165,872 available for dividend. The total division for the year out of this amount is £10 per share on the A and C shares, and £1. 13/4 on the B and D shares, leaving a balance of £35,538 to be carried forward. Various new undertakings of the company are progressing in a favorable manner. The Sheffield Forge and Rolling Mills Company, Limited, has made a profit of £6561 on the year's transactions, furnishing a dividend of 7½ per cent. A meeting of the Silkstone Fall Colliery Company, Limited, was held at Barnsley on Monday. This company was formed in 1871 with a capital of £50,000, the first dividend paid was one of 25 per cent., presumably out of capital. In March last the capital was reduced to £10,000 and the colliery was abandoned as utterly worthless. It was now stated that the clay was quite unfit for use, and it was therefore proposed to wind up the company, which the chairman of the meeting characterized as "a worthless and wretched concern."

There is a fair amount of work doing in several branches of the cutlery trade. In one or two of the higher class departments I hear that the workmen have been granted an advance in wages, equal, I believe, to about five per cent. Good African ivory is very scarce and dearer, the best being now quoted at about £1400 or £1500 per ton. Interior is £900 to £1100 in England.

SWEDISH IRON.

The *Engineer* has the following rather pertinent paragraph, anent Swedish iron: "Swedish iron masters are pushing business by intimating to certain of their agents in this country that there is a probability of prices being declared up during the ensuing winter; and agents are, of course, acting upon the intimation, and are in their turn trying to push business on this side. Messrs. Lander & Larsson, of Birmingham, state that owing to the increased demand during this year for all the well-known brands of Swedish charcoal nail rods, wire rods, bars, boiler plates, sheet iron and pig iron, &c., they have an unusually small quantity for disposal previous to the probable frost setting in. As they fear that there may be a severe winter again, they advise buyers to order immediately, and thus to secure their supplies before the winter sets in. They have received advices from Sweden that Swedish iron will, in all probability, be increased in price at an early date. All the iron that comes from Sweden is, no doubt, Swedish iron, but it would be interesting to know what the Swedes do with the large consignments of pig iron which they take from England. In The *Engineer* attention has been drawn to the fact that as many as 240 tons of Cleveland pigs were shipped from Middlesbrough to Sweden during the month of July. Do all the people who buy Swedish iron 'see that they get it?'"

BIRMINGHAM AND STAFFORDSHIRE.

The weekly iron trade meetings at Birmingham and Wolverhampton have not brought about any particular alteration in the general state of the iron trade, but a settlement of the wages of the puddlers and mill men has been arrived at. Puddlers' wages are fixed at 9/ per ton, but with the sanction of the Arbitration Board to individual arrangements, whereby an extra sum, not exceeding sixpence per ton, is allowed to be paid to cover certain alleged discrepancies. The millmen's wages are to be reduced 5 per cent. The effect of this is that the puddlers' wages are restored to 9/6 per ton, so that it is supposed they will settle down to work again contentedly. Common irons are a little firmer in price in Staffordshire, unmarked bars being £8 to £8. 5/, and sheets (singles) at £11. Sheets are now selling fairly well for ordinary uses and galvanizing purposes. Other descriptions are not moving off at all rapidly. Good consignments of implements, tools and machinery are being made to Russia and Northern Europe, and better orders are to hand from France and Norway for all kinds of hardwares. Wrought hollow wares are selling freely, as also are locks, notwithstanding the recent rise in prices. The brass founders continue to be remarkably busy, and the fancy jewelry trade is well engaged.

ANOTHER IRON TRADE FAILURE.

It is announced that Messrs. Samuel Freeth & Co., of the Phœnix Iron Works, Millwall, and the West Drayton Iron Works, have suspended payment, and the books are in the hands of Messrs. Robert A. Maclean & Co. The liabilities are estimated at £30,000, and the assets at £11,000. A petition for liquidation has been presented, and Mr. Maclean has been appointed receiver and manager of the works, which are being continued by him.

SOUTH WALES.

Matters remain very flat indeed in this locality, the iron works being only engaged irregularly, and then merely to the extent of about one-sixth of their total productive powers. Dowlais has a few rail orders on hand for Russia, and is said to be likely to obtain one for 2000 tons more from the same quarter. Cyfarthfa is not doing much, but at several other establishments everything is in trim to take advantage of the first favorable iron trade breeze.

THE METAL MARKETS

were quiet on Monday. On Tuesday 30 tons Chili bars, named brands, sold at £82. 15/; 25 tons ditto at £83; 50 tons g. o. b. at £82. 10/; 50 tons Straits tin, spot, at £82. 10/ to £83, and 20 tons September-October, ditto, £81. 10. On Wednesday no Wallaroo could be had, 10 tons Straits tin sold at £82. 10/, and 30 tons Australian £80. 10/ to £81. 10/. On Thursday the market was expectant of cargoes for copper, ten tons Straits sold £82. cash, 20 tons Australian £80. 10/, and English £90. On Friday copper was depressed on the advice of 5000 tons chartered during last fortnight of August, ; 25 tons g. o. b. sold £81; 10 tons Australian £80. Lead and spelter firm all the week.

Messrs. Kelly & Co.'s circular says: "*Copper*, after a quickened demand at an advance, on occasion-, has got into a fit of steady dullness. High brands of Chili bars pass more freely. Regulus is in request. Wallaroo copper out of the market altogether. *Tin* has been in better request the last day or two, and there are appearances of further improvement. Tin plates have slightly improved in demand, with prices firmer. *Lead* has been favored recently with more attention, and a large business has been effected at full rates, and in some instances at an advance of 5/. Soft Spanish, without silver, £22. 10/. *Spelter* very firm. Common Silesian, £24. 15 to £25, on spot; hard, £18, 10/. A small lot of Australian has recently been sold at £19 by auction. English dearer. Zinc sheets dearer, and a good steady business doing. *Quicksilver* stands nominally at £9 5/. Nothing more has been heard of the recent alleged discovery of quicksilver at Shrewsbury. *Antimony* in slow request, but firm. *Nickel*, 11/ to 12/ per lb. *Silver* suddenly improved to 60⅝d., has again fallen to 56⅝d., the oz.

Von Dadelszen & North say: "*Copper* firm, but not active. Chili bars have sold at £82. 10/, for G. O. B., and £82. 15/ to £83 for named brands. The charters for last fourteen days August were telegraphed late yesterday as 3000 tons. Wallaroo still quite nominal. Burra, £89. 10/ to £90. English firm. *Tin* was very stiff early in the week, and £83 paid for Straits, £81 for Australian. The close is easier, sellers at £82 for Straits, and £80. 10/ for Australian. Banca keeps about 52lb., and Billiton 49½d. English advanced to £90 for common ingots. Tin plates still dull and cheap. *Lead* firm; £23 for good soft English. *Spelter* nominal, £24. 15/. *Quicksilver* advanced to £10. 10/, and importers now refuses to name price; £11. 11/ paid this afternoon.

The *Mining Journal* remarks: *Copper.*—Throughout the week the market has been steady, and though the actual business transacted has been somewhat limited, yet quotations have been more than maintained, the tendency being toward higher prices, more particularly as regards English qualities, which is rather an exceptional feature in the market, but upon receipt of charters from the West Coast for the last fortnight in August, exhibiting a total of 3000 tons, the market has somewhat flattened, and Chili bars are not quite up to previous quotations, and buyers are prepared to do business at about £81. 10/, but not higher. Sellers will not submit to such a concession, so that the market closes quiet. English tough, £89 to £90; best select, £90 to £91; sheet copper, 4x4, £95 to £96; and strong copper, £96 to £97. Australian qualities are quoted from £89 to £91, but with very little doing. The inquiry for yellow metal is limited. There are buyers at 7⅝d, but sellers asking 7¾d. to 8d., orders are difficult of execution. *Spelter.*—The demand is a little more active, and Silesian qualities are not obtainable under £24. 10/ to £25. The market for English hard spelter is firm. There are buyers at £18. 5/ to £18. 10/, but since Silesian has improved makers are holding for higher prices. *Lead.*—A large business has been done during the week, and prices are consequently very firm. Good soft English pig is now quoted £23 to £23. 5/, and smelters are indifferent about taking orders at these prices, and require a considerable time for delivery; indeed, some makers refuse to deliver any under two months, and are disinclined to book orders at current rates. *Quicksilver.*—A considerable business has been doing during the week, at advancing prices, and to-day we quote £11. 11/ per flask, nominal; but importers refuse at the moment to book further orders at the price. *Tin.*—The market has been fluctuating throughout the week, sometimes showing a slight advance, and at others a fall in price to the extent of not more than 10/ to 20/ per ton. Straits to-day is quoted at £82. 10/ to £83, and Banca £88; Australian, £80. 10/ to £81. *Tin Plates.*—There is very little doing, and the price remains very much unaltered.

Mr. James Hallow's Liverpool circular reports: "The metal market has improved considerably in some articles, while others remain as dormant as before. English copper has been in good demand, and prices have been advanced, which checks business. A decided improvement has taken place in Chili, and prices are about £4 per ton higher; this is owing to consumers and exporters buying freely. Market closes firm at £82. 10/ for g. o. b.; select brands, 10/ to 30/ per ton more. *Ore and Regulus.*—Some considerable transactions have taken place on private sales—in all about 3220 tons ore at 16/6 per unit, and 1880 tons regulus at 17/ per unit, all to arrive; also 600 tons ore at Swansea at 16/6 per unit."

Latest Liverpool prices are these:

Iron: f. o. b. in Liverpool, per ton.

	£	s.	d.	£	s.	d.
Merchant bar	7	17	6 @	8	2	6
Merchant bar, in Wales	7	7	6 @	7	12	6
Staffordshire	8	10	0 @	11	15	0
Hoop	9	10	0 @	11	0	0
Sheet	11	5	0 @	11	15	0
Nail rod	8	15	0 @	9	5	0
Bar, best crown	8	10	0 @	8	15	0
Boiler plates	11	5	0 @	12	0	0

Tin Plates: f. o. b. in Liverpool, per box.

	£	s.	d.	£	s.	d.
Charcoal, I. C	1	8	0 @	1	10	0
Coke, I. C	1	2	0 @	1	4	6

Copper: Delivered in Liverpool, per ton.

	£	s.	d.	£	s.	d.
Bolt and Sheathing	93	0	0 @	94	0	0
Tile	88	0	0 @	90	0	0
Tough cake	87	0	0 @	89	0	0
Best selected	90	0	0 @	91	0	0

The Plow in History.

A writer in the *Maine Farmer* gives the following interesting historical sketch of the plow: The first and most ancient plows that were used are represented as being forked sticks, with the shorter prong sharpened to scratch the ground, and the longer one used by which to draw it. Time has wrought great changes in the improvement of plows since those days; but still there is yet room for further improvements. Perhaps the next plows that came into use, that deserved the name, were made of wood sheathed with iron plates, with wrought iron share and a wooden standard with two pins put in by which to hold it. The first patent for a plow was granted in 1720 to Joseph Foljambe, of Rotherham, England. This, too, was made of wood, both the mold board and land side, with wrought iron share and a coulter. This was considered to be a great improvement over those previously used, and it is said that all plows made similar to this bore the name of Rotherham plows, for many years. The first cast iron mold board was invented in the year 1740 by James Small of Berwickshire, Scotland, and he continued their manufacture for about 50 years; but used the wrought iron share. Robert Ransom, of Ipswich, England, has the name of inventing the first cast iron share, in about the year 1785, but it was not until 1803 that he made the improvement in chill-hardening the edges.

Probably the first cast iron plow that was made in America was made by Charles Newbold, of Burlington, N. J., and it was a plow with moldboard, land side and share, all in one casting; his first patent was dated June 17, 1797, and it is said that Mr. Newbold spent $30,000 in a vain effort to get his plow into general use, the farmers being so prejudiced against them that he gave up their manufacture in despair. About the year 1800, Peter Curtenas, of New York city, advertised and kept for sale cast iron plows. David Peacock, of New Jersey, in 1807, bought out Newbold (some of his patterns probably), and paid therefor $1000, on which he made some improvements, such as casting the parts separately, and adding a wrought iron share with steel edge. Edwin A. Stevens, of Hoboken, N. J., in 1817 made improvements on Newbold's plow, as chilling the cutting parts and edges so as to be more lasting, and also changed the form to make the draft easier. His patent was dated 1821; this plow was spoken quite highly of; but as other engagements were pressing, he abandoned the business, which might have been profitable to him. Josiah Dunbar, in 1810, began to make a series of improvements to the cast iron plow, which proved to be of great benefit to the farmers, and also to the manufacturers of plows; but his name seems to be nearly forgotten. Joel Nourse, of Boston, has made and sold as many plows as any man in America, probably; and perhaps as many improvements have been made under his supervision as that of any man. The immense plow business of Ruggles, Nourse & Mason was made a success probably by the high standing of Mr. Nourse as a plow manufacturer. The celebrated Eagle plows were good in their time, and the firm of Ruggles, Nourse & Mason and their successors, sold, it is said, in the period of twenty years—from 1841 to 1861—twenty-five thousand per year. Prouty & Mears also manufactured plows quite largely, and many were used throughout the country, and the Hitchcock plow was considered a very good implement. Mr. Mears of this firm was said to be a good mechanic and made many valuable improvements; the center draught principle, perhaps, being the most important.

From the earliest history of the plow to the present time, slow and steady has been the march of improvement. Subsoil plows have also been invented, and they have proved to be an important implement; and for soils free from rocks the one invented by Prof. Mapes, of New York, is perhaps as good as any. Steam plows have also been invented; one patented by Owen Redmond, of Rochester, N. Y. Mr. Fawkes, of Pennsylvania, has invented one, and it has been tried on the prairies of Illinois, but with little success. Mr. Fowler also invented one, which has some good points, and on large enclosures may yet be made a success. Lord Dunmore, of England, invented one, which is said to be quite successful; it is a three furrowed balance plow, with traction engine. It is said at the time of trial the land was in a wet state after a heavy rain fall, and that it cut straight furrows ten by six inches, and five acres per day, at a cost of about one dollar per acre.

Cast Iron Car Wheels in England.

We are glad to see that our English neighbors, who have looked with suspicion and disfavor upon our cast iron car wheels with chilled tread, are getting over their prejudices and seeking to determine by experiment whether these wheels are as good as we have claimed them to be. The following paragraph, which we take from the *Iron and Coal Trades Review*, sounds very much like a condensation of an article which appeared in these columns some months ago:

"A number of gentlemen interested in railways, engineers and others, met at the machine works of Mr. Horn, Millbank Row, Westminster, recently, for the purpose of witnessing the results of tests applied to the 'cast iron chilled wheels' manufactured by Barnum, Richardson & Co., of the Salisbury Iron Works, Conn. The experience of America, where the frost is so severe, would, therefore, seem to be in favor of these wheels; but, as an opinion existed in England that they were easily fractured, the manufacturers resolved to try the question by experiment, and hence the appeal to the tests applied last week. These were certainly of a severe kind, and it was not until the wheels had been struck 267 times with two hammers weighing 28 lbs. and 32 lbs. respectively that the iron partially gave way. It is claimed for the wheels that they are not only the most safe, but the most durable and economical."

If these wheels are given a fair trial in practical service, we are satisfied it will be found that all that is claimed for them is realized in practice. Wheels which will run from 40,000 to 200,000 miles, and which are sold by the makers under a 40,000 mile guaranty, are something of which the English railway engineers know very little; and of cast iron which possesses an average tensile strength of 22,000 lbs. to the square inch they know practically nothing. We can fill their orders, however, for as many such wheels or as much of this kind of iron as they may want.

M. de Foville, in an article in the *Economiste Francais*, on the manufacture of glass in France, gives some facts of great historical and scientific interest, from which we gather the following: France long remained indebted to Italian art in the matter of making glass, although in the sixth century drinking glasses were manufactured at Paris and Quiquengrogue. But in 1342 we find a Dauphin paying for a little glass service, for his daughter Diana, the price of an ox. Some of the most curious windows in the Gothic cathedrals date from the thirteenth, twelfth, and even eleventh centuries, but it was only under Louis XIV. that France appropriated the secret of these exquisite productions, which Venice sold her for their weight in gold. There are now in France 175 glass manufactories, without counting seven manufactories of looking glasses. Every year on an average 125,000,000 bottles are made, and 50,000,000 of these, filled with good wine, find their way abroad, together with about 20,000,000 empty bottles. Forty years ago 100 bottles cost about thirty francs; now they cost half that price. According to M. de Foville, the invention of glass deserves to rank with printing and steam as an agent of civilization and refinement, for it rendered indoor life possible. There are proofs, he says, that glass existed in the early days of Christianity, but it was an exceptional luxury which did not survive the fall of the Roman Empire. The window pane reappeared at a later period in the churches under the form of small lozenges of equivocal transparency. At the castle of the Duke of Northumberland, in 1567, says the writer, there were a few glass windows, which used to be put in when his Grace was at home; and not a century ago there existed in France a corporation of "Chassis-iers," whose profession was to put in windows of oiled paper. It was only in 1710 that glass panes in wooden frames were used.

Brooklyn's Water Mains.

The first main, upon which Brooklyn depended for water until 1867, is 3 feet in diameter, and extends along the Cypress Hills plank road to Cooper avenue, down Cooper avenue, through Broadway and DeKalb avenue to Vanderbilt avenue, where it is reduced in diameter to 2¼ feet. From thence it extends along DeKalb, through Fulton avenue and Joralemon street to Clinton street, and along Clinton street to Hamilton avenue. A 30 inch branch main proceeds from the corner of DeKalb avenue and Broadway, along Broadway to Union avenue; and another branch main of the same calibre extends from the corner of DeKalb and Washington avenues, along Washington and Underhill avenues to the Prospect Hill engine house. Through the increased demand for water, this main soon became unequal to the supply; and in 1867 a second main was added. This main starts from the efflux-chamber parallel to the first, but soon bends to the south, and passes along the Jamaica turnpike and Atlantic avenue to Clinton street, where it is connected with the first main. Its diameter is 4 feet, and its total length 6⅝ miles. From the ends of these large mains, and at various points in their length, 10 twenty inch mains extend, conveying the water to the extremities of the city, and acting as temporary feeders during the repair of any portion of the principal mains. The larger mains were laid in such a manner as to penetrate the then centers of population, their branches to reach toward and into the outlying neighborhoods. Their capacity is at present far in advance of the needs of the people; but with the growth of the population they must fail, and an additional 5 foot main will eventually be laid on the north of the present mains, and extended to the center of the rapidly growing Eastern District. The loss of head at present does not exceed ten feet during the hours of heaviest draught. The pipes of which the mains are composed are of cast iron, varying in thickness with the pressure that they are called upon to sustain. A large number of them came from Glasgow, Scotland; the remainder from foundries in New Jersey and Pennsylvania. At convenient points along the line of the mains gates are placed to control the quantity of water flowing through them, as well as to cut off the water for repairs. The gates are inclosed in brick chambers, entered through an iron man-hole set in the surface of the street. The spindles of all of the gates are geared for power, with bevel gearing in the proportion of 3 or 4 to 1. The number of threads on the screws by which the valves are moved is usually either 4 or 5 per inch, so that it is necessary to turn the wrench 784 times with all the force that four men can conveniently exert to open or close a 48 inch gate. When the pressure is all upon one side of the valve, a much greater force than this is needed to raise it. From the number of the cross connections between the mains there is little danger of the supply being cut off by a break in either, except in that portion of the 48-inch main between Nostrand avenue and the reservoir, the failure of which would cause serious inconvenience upon the higher grades. The interior of the mains originally laid are now thickly covered with a coating of rust-nodules, or "tubercles," which resemble mushrooms in form, and are composed of oxide and carbonate of iron, with some clay. The inner surface of the pipe beneath these formations seldom appears corroded to any considerable extent; and the question has been often raised whether the iron in the rust was originally a part of the water or of the pipe. The great disproportion in bulk between metallic iron and its hydrated oxide will amply account for the existence of a large amount of the latter without any readily perceptible loss to the pipe. All of the mains and smaller pipes laid since 1862 have been coated, both inside and out, with a varnish of coal tar and linseed oil, into which each pipe is dipped, while hot, at the foundry. This coating affords an almost complete protection against the formation of tubercle.

The interior diameters of the mains and pipes at present in use are 48 inches, 36 inches, 30 inches, 20 inches, 12 inches, 8 inches, 6 inches and 4 inches. Originally the term "main" was applied to all pipes of 20 inches diameter and upward, and these were never allowed to be apped for the purpose of private supply. Wherever water was required upon streets in which they were located, an additional pipe was laid This was eventually found to result n a needless multiplication of pipes, and the 2 0 inch mains were permited to be tapped in the same manner as the smaller pipes. At the outset, the ruling length of the pieces of which the mains and pipes are composed was 9 feet. They were then cast horizontally, or nearly so; and with a greater length, the sagging of the core, or mold of the interior, would have resulted in an inequality in thickness between the top and bottom. This mode of casting has since been changed, all of the pipes used at present being cast vertically and 12 feet in length. They are connected by inserting the spigot, or straight end, of one pipe into the hub, or bell-shaped mouth, of another, driving several strands of hemp into the annular space between the spigot and hub, pouring from 2 to 2½ inches of melted lead into the space, and finishing the joint by driving the lead compactly home with proper tools. This kind of joint admits of considerable movement of the pipe before it shows signs of leaking, and is readily made water-tight again by a few blows of the hammer. The pipes used are divided into two classes, according to their thickness, and designated as A pipe and B pipe by having these letters cast upon them. The A pipes are used upon grades higher than 50 feet above tide, the B pipe being used upon the lower grades. The pipes are cast by contract, at various foundries in New Jersey and Pennsylvania, among which are those at Camden, Florence, Conshohocken and Phillipsburgh. The Water Department invariably stations a resident inspector at the foundry where the pipes are being cast. It is his duty to look to the quality of the iron or ore used in the furnaces, and to protest against the introduction of improper material. When the pipes are cast, they are cleaned from the adhering portions of mold and core, and submitted to a preliminary hammer test by the inspector. This often results in the discovery of cracks from unequal shrinkage or from careless handling, porous cavities caused by the cooling of one portion in advance of another, masses of sand broken loose from the core and become imbedded in the iron, together with many other objectionable defects sufficient to warrant him in rejecting the casting without further trial. The pipes that are found apparently free from these defects are heated and immersed in a protective varnish and placed in the proving press, where they are subjected to an interior hydraulic pressure of from 250 to 300 pounds per square inch. While under this pressure, they receive several sharp blows of a hammer. If this test be satisfactory, they are weighed, marked and forwarded to the pipe yard at South Brooklyn, where they are again weighed and sent out, as occasion demands, to become a part of the general distribution. Each pipe has its number, class letter, date, and name of maker cast upon it, besids the weight marked in white paint. The average weight per foot of the several sizes of pipe is as follows: 4 inches, 24 lbs.; 6 inches, 37 lbs.; 8 inches, 49 lbs.; 12 inches, 76 lbs.; 20 inches, 180 lbs.; 30 inches, 340 lbs.; 36 inches, 410 lbs.; 48 inches, 712 lbs. The total weight of the iron pipe now lying in the streets exceeds 50,000 tons. In addition to the cast iron pipe, there is about 2 miles of cement lined wrought iron pipe in use. The limited amount of this pipe that was laid was due to the prevailing distrust of its durability at that time. No leakage, however, in the existing 2 miles of pipe has been discovered during the past three years. At points where it is desirable to connect the pipes, special castings in the form of a cross or letter T are inserted; and also where fire hydrants are located, branches for that purpose are put in. Formerly the branch pipes leading to the fire hydrants were only 4 inches in diameter; at present they are increased to 6 inches, which admits of the use of several hose connections on the same hydrant, and more than doubles the supply of water. Seven different patterns of fire hydrant have been used upon the works, but none have proved so reliable as the original Coffin Hydrant, which, notwithstanding its unsightly wooden box, has given less cause of complaint, and has required less repair than any other form that has yet been tried. The total number of fire hydrants now in position is 2208. There are also 30 surface hydrants rising directly from the mains and covered with an iron manhole casting set in the surface of the street. These hydrants have a movable head containing the hose outlets which is kept until wanted at some convenient locality near to the hydrant. Drinking hydrants, originally designed on the Holly Tree principle, to rescue the pedestrian from the allurements of the bar, have latterly been erected for the supply of people whose means do not permit them to introduce the water into their houses. They are a perpetual joy to amateur hydraulicians, and, at such times, a terror to the passer by. The present number upon the works is 850. Along the river front, and at several points on the line of the principal mains, are blow-offs, or outlets, for the purpose of drawing off the water for repairs to the pipes or to free them from sediment. The former discharge directly into the river—the latter into the sewers or into basins especially constructed for that purpose. The leading design in planning the pipe distribution has been to introduce into the various sections of the city one, or, if practicable, two, mains from different directions, and preferably from different sources, each of which shall prove adequate to the supply of that section when it shall have been solidly built. With this arrangement, in the event of an accident to either main, the other can still be relied upon. The conections with the principal mains are infrequent, lateral branches occurring only at long intervals, and provided with gates at such points, both upon the branch and upon the main. In the case of the 20-inch pipes, the ramifications are increased, frequently connecting with 6 inch pipes, which are always provided with a gate near the branch. This latter size is that principally laid for the general supply, while 8 and 12-inch pipes are interspersed at proper intervals, not that the streets in which they are laid require more water than others, but to facilitate the circulation and to serve as feeders to convey the water around any particular portion of the main that may be temporarily thrown out of use. The gates of the smaller pipes are set in wooden boxes with iron covers, usually on the building line of the street and six feet from the curb. The number of gates of all sizes now in use is 1793. The pipes are all laid at a depth of 4 feet below the surface of the pavement, and where practicable, upon the north or east side of the street, 6 feet from the curb. Some few exceptions to this occur in unusually wide streets and in those paved with an expensive pavement, in which case a pipe is laid under the sidewalk on either side of the street. Each separate supply is obtained by drilling a hole into the pipe and inserting a brass tap. This tap is perfectly smooth upon its driving point, and is not screwed, but simply driven in, retaining its place by friction. It has a movable plug similar to that of an ordinary faucet, and a coupling to connect it with the lead pipe, four feet of which is always laid next to the tap, although iron pipe may be used to carry the water into the premises. The water way of the taps used for the supply of private dwellings is three-eighths of an inch in diameter. Factories and public buildings are supplied from half-inch and five-eighths inch taps, or from several of these connected with a single pipe, while large manufacturing establishments, as sugar houses, breweries, etc., are supplied through four inch pipes. Many of these have also an independent line of four inch pipe, carrying the water throughout the entire buildings, with hose attachments in every room, kept in readiness for immediate service in case of fire. House services are of lead, tin lined lead, iron, galvanized iron, and cement lined pipe. Most of these have their disadvantages.

The lead pipe poisons the water, the iron pipe rapidly fills with rust, and the galvanized iron is even worse than the lead, in that wherever the zinc flakes off, or wherever a brass cock is placed, a galvanic action ensues at the expense of the zinc, contaminating the water with a metallic salt scarcely less detrimental to health than are the salts of lead. The cement lined pipe has not been used sufficiently to test its qualities.

The original pipe distribution comprised 10 miles of mains and 110 miles of distribution pipes. This amount has been annually increased until at the present time the total length is 16¼ miles of mains and 276¼ miles of pipe, or 292½ miles in all. Four submerged lines of pipe have been laid, two of which are still in use. One of these—a 12 inch pipe—supplies that portion of the city which lies along the shore of Gowanus Bay, and crosses the Gowanus Canal at the Penny Bridge; the other—a 6 inch pipe—lies in the bed of the Wallabout Channel, and carries the water to the Ordnance Dock of the Navy Yard.

Near the mouth of the Gowanus Canal is the pipe yard, at which the pipes and other appurtenances are received, inspected and kept until required for use. On Portland avenue, between Park and Myrtle, is the repair yard, where all of the material and implements necessary to remedy any defects in the distribution are stored. Here all of the water meters are tested and repaired, and all the perishable portions of the hydrants, gates, etc., kept constantly on hand. The number of tools, patterns, fittings, and miscellaneous supplies is immense, but all are arranged with such admirable system and order that each is readily found as occasion requires. The office of the repair yard is connected by telegraph with the City Hall, the Central Police Station, the reservoir, and the engine house. This yard is the headquarters of a corps of able and efficient men, who stand ready at all hours of the day or night to attend to any accident to the distribution. Water is popularly supposed to be one of the most innocent of substances; but when bursting from its confinement, with a pressure equal to that ordinarily existing in steam boilers, its capabilities for mischief are manifest. The veterans of the pipe yard tell of many scenes of excitement, if not of danger, at their midnight "leaks in main." A smaller establishment on North First street affords a rendezvous for a similar corps of men, though fewer in number, who keep the distribution of the Eastern District in a thorough state of repair.—*Ledger.*

The Newark Industrial Exhibition.

The fourth annual industrial exhibition at Newark, N. J., opened Monday evening of last week, in the building of the Industrial Institute, in Washington st., between Court and Marshall streets.

Formerly these exhibitions were restricted to goods made at Newark. This year the invitation has been extended to manufacturers in all parts of the State of New Jersey. The wisdom of this course is already apparent, as it deprives the exhibition of its strictly local character, brings visitors to the city from other parts of the State, and introduces features of general interest not before seen in the exhibitions. Newark has certainly a very wide range of manufacturing industries carried on within its limits, but as the chief city of the State it is, and should be, the point at which the State Industrial Exhibition is held.

On the night of the opening there was much disorder, and comparatively few departments were in condition to be inspected by the public. Most of the space filled was occupied by exhibits representing other than local industries. When the exhibition is fairly organized, we shall have something to say about such of the articles shown as are of especial interest to our readers.

The following are the officers of the Institute: David M. Meeker, president; Phineas Jones and Charles N. Lockwood, vice-presidents; Albert M. Holbrook, secretary; Isaac Gaston, treasurer, and 27 directors.

In the course of a brief address delivered at the hour of formal opening, Governor Bidle said: "This is an exhibition literally. No premiums for competition are offered. None need refrain from sending their wares and handiwork for fear of any unfair prejudice or design on the part of committees of award Whoever exhibits here has the public for his judge and critic. The public is not slow to appreciate and reward genuine worth, whether in material things or in character. In mechanical arts the world is advancing with rapid strides. The lawyer, or theologian, or physician, or philosopher must have the advantage of others' researches, and so must the mechanic of another's judgment and skill. No people catch and appropriate the force of an idea quicker than the American. An exhibition like this is a grand advertisement."

Undressing by Machinery.

The Jackson (Mich.) *Patriot* tells the following interesting story of what happened in the Etna Mills a few nights ago: About midnight some gearing in the extreme peak of the mill began to creak, and Mr. Cornell went up to oil it. It was in a low part of the room, well under the eaves, and in applying the oil he was obliged to reach over a shaft. While stooping down a key on the shaft became caught in the breast of his shirt, and about the time he was through his job had taken up all the slack, and held him down, and was drawing him still tighter. He was thrown over the shaft, his light went out, and then in the dark he cooly braced himself and let the shaft slowly tear off his clothing by strips, and the undressing operation was not delicately performed either. It would not do for him to struggle much, as on either side was gearing within a few inches of him that seemed waiting to seize on a member and draw him into its destructive embrace. Gradually his clothes parted company with him, causing severe pain by the roughness of their taking off, and at last he felt he was no longer in the toils. Slowly he drew himself back, and wiping the heavy drops from his brow, brought out there by the agonizing strain of body and mind during the trying ordeal, he started to group his way down stairs, for he knew that cries of help would be unavailing, and would not be heard below.

On hands and knees he made his way, narrowly missing falling to the floor below, his outstretched hand going over the aperture, warning him of the danger and at the same time serving to tell him where he was. He crawled along under shafting and around posts, feeling his way along till he reached the head of the stairs, when he staggered to his feet and got down to the ground floor and appeared to his fellow workmen, pale and trembling, clad in the light and airy costume of a shirt collar and the waistband of his pants. His first remark was:

"Well, boys, I've stopped that squeaking."

The Importance of Sewer Drainage in Cities.

The city authorities of Baltimore are considering the question of draining that city by means of a system of sewers. The Baltimore *Gazette* makes the following pertinent remarks on the subject:

Possibly, the problems involved would have been thrust into public notice sooner, but for the topographical advantages possessed by our city in regard to surface drainage. The general cleanliness of our streets—so very striking to those who are familiar with the condition of other populous cities—is due largely to the undulations of the ground on which Baltimore is built, and to the three or four great drainage conduits that nature has provided, and through which, and by surface channels, the sewage has been carried year after year into the Basin, until it has become a pestilent pool. The time has now come, as it comes sooner or later to all large cities, when the sanitary errors of the past have to be corrected by the fuller knowledge and more thorough methods that modern science teaches, and which a proper regard for the preservation of the public health makes imperative.

The greater the space built upon, and the more crowded the community, the more abnormal the sanitary conditions are apt to be. Sudden increase has its evils, and one of these is, that underground drainage is too frequently neglected until the necessity for it is forced upon public attention. The warning comes to some cities in the shape of a terrible visitation of pestilence; others, less exposed to deleterious influences, or better prepared to neutralize them, are mercifully spared. It is necessary, nevertheless, even for the latter, that they pay constant regard not only to the cleanliness of their streets and by-ways, but also to those precautionary things that appertain to the ventilation and drainage, and freedom from malaria, of their dwellings. It should be constantly borne in mind that from the moment building begins, nature is put aside, and man must provide his own methods of meeting the new sanitary condition. In nature, the grasses, and the foliage of compact masses of woodland, play an important part in absorbing malarious emanations; appropriating the products of decay, and keeping the atmosphere pure and sweet. A city, "covers the soil from sunlight and sunheat, and, necessarily, makes its condition as to moisture quite different. It interferes with the range of winds, and modifies the immediate thermometric and hygrometric conditions of the atmosphere. It throws the rainfall into streams upon the ground around its sides, instead of allowing it to diffuse itself, as it does in nature, in drops. In winter, it causes accumulations of snow and ice. It alters the course of water, making, not unfrequently, the cellar, the well, the cistern, the cesspool, the privy vault and the sewer, parts of its underground drainage. In a word, it alters the whole relation of the ground occupied, and of its immediate surroundings.

"Beside all this, the necessities of habitation create filth, garbage, dust and refuse of various kinds, which are added to the soil just where it cannot use them."

It was a theory advocated not long since before one of the learned societies of the United States that one of the causes of typhoid fevers, in winter, was the great inner heat of houses ill drained, built on new ground, or otherwise defective in proper dryness and purity in their underground arrangements. It is easy enough for these defects to occur, even without the knowledge of the inmates. No offensive smell tells the tale of peril; no concrete or cement will thoroughly shut it out. When winter comes the heat of the furnace sucks up the contaminated air, and sends it to do its dangerous work over the whole house; into every apartment, nook and cranny.

It is a subject of vast importance, this of the particular healthfulness of our dwelling houses and of the general sanitary condition of the city. It has been well said that perfect under-drainage as devised by the best skill of the best engineers is the first great need of all cities. Next to this is the proper care of cellars, back yards and all underground cesspools and reservoirs.

The work upon the foundations of the Bessemer Steel Works, attached to the Vulcan Iron Works, of Corondelet, is making good progress, although the contractors have been much embarrassed and delayed by the flooding of the excavations during the recent rise in the river. No time will be lost by avoidable delays.

London Metal Market.

(*From The Mining Journal.*)

	£.	s.	d.	£.	s.	d.
Copper—₱ ton.						
Best Selected	89	0	0	90	0	0
Tough Cake & Tile	88	0	0	90		
Sheathing and Sheets	94	0	0	95		
Bolts	92	10	0	93	0	0
Bottoms	93	0	0	0	0	0
Old	80	0	0	0	0	0
Australian, Wallaroo	90	0	0	91	10	0
" other brands	86	0	0	89	—	
Chili bars, g. o b	84	0	0	88	0	0
Wire ₱ lb.	0	0	11¾		—	
Tubes "	0	1	0⅝		—	
Brass—₱ lb.						
Sheets	0	0	9	0	0	10
Wire	0	0	9¼	0	0	0
Tubes	0	0	9⅛	0	0	11¼
Yellow Metal Sheathing	0	0	7⅝	0	0	8
Sheets	0	0	7⅜	0	0	0
Spelter—₱ ton.						
Foreign on the spot	23	15	0	24	0	
" to arrive	23	15	0			
Zinc—₱ ton.						
In Sheets	30	0	0	31	0	
Quicksilver—₱ bottle.	9	5	0			
Tin—₱ ton.						
English Blocks	87	0	0	88	0	0
Ditto Bars (in bris.)	88	0	0	89	0	0
Ditto Refined	89	0	0	90	0	0
Banca	83	0	0	84	—	0
Straits	82	0	0	83	—	0
Australian	80	0	0	81	0	0
Tin Plates—₱ box.						
IC Charcoal 1 qual.	1	10	0	1	12	0
IX " 1 qual.	1	0	16	1	18	0
IC " 2 qual.	1	8	0	1	9	0
IX " 2 qual.	1	14	0	1	15	0
IC Coke	1	3	0	1	4	0
IX "	1	0	0	1	18	0
Canada Plates ₱ ton.	15	0	0	15	10	0
" at works	14	10	0	15	0	0
Iron—₱ ton.						
Bars Welsh, in London	7	15	0	8	—	0
" to arrive	7	15	0	7	17	6
Nail Rods	8	5	0	9	10	0
Nail Rods, Staff'd in L'ndon	8	15	0	9	10	0
Bars	9	0	0	9	5	0
Hoops	10	5	0	10	10	0
Bars at Works	8	5	0	9	5	0
Hoops ditto	9	5	0	11	6	0
Sheets, single, and plates	11	15	0	14	0	0
Pig, No. 1, in Wales	5	0	0	6	10	0
Refined metal ditto	7	0	0	8	0	0
Bars, common ditto	7	5	0	7	10	0
Do, merchant, Tyne or Tees	7	15	0	8	0	0
Ditto, Railway, in Wales	6	10	0	7	0	0
Ditto, Swedish, in London	15	0	0	15	10	0
To arrive	15	0	0	—	0	0
Pig, No. 1, in Clyde	3	0	0	3	5	0
Ditto, f.o.b., Tyne or Tees	2	15	0	3	0	0
Ditto, Nos. 3, 4, f.o.b	2	13	0	2	15	0
Railway Chairs	4	0	0	4	10	0
" Spikes	12	0	0	13	0	0
Indian Ch'coal Pigs in L'don		0	0		0	0
Steel—₱ ton.						
Swedish, in kegs (rolled)		—			—	
Ditto (hammered)	19	5	0	0	0	0
Ditto, in faggots	20	0	0			
English, spring	18	0	0	22	0	0
Lead—₱ ton.						
English Pig, common	23	0	0	—	0	0
Ditto, LB	23	0	0		nom.	
Ditto, WP	23	0	0	23	10	
Ditto, Sheet	23	0	0		0	0
Ditto, Red Lead	24	0	0	—	0	0
Ditto, White	30	0	0	32	0	0
Ditto, Patent Shot	26	0	0	—		
Spanish	22	5	0	0	—	0

* At the works, 1s. to 1s. 6d. per ton less. Terne plates 2s. per box below tin plates of similar brands.
† Add 6s. for each X.

Stafford Manufacturing Co.'s
STENCIL COMBINATIONS.

Containing: Stencil Alphabet, Figures, Can Stencil Ink and Brush.

For marking boxes, barrels, bags, and packages for shipment. Printing all manner of show cards, notices, signs, numbers, prices, &c., and other purposes too numerous to mention. Instructive and amusing for boys.

WHOLESALE PRICES.

Size, ¼ in., per dozen	$6·00	Size, 1¼ in., per dozen	$10·00
" ¾ " "	6·50	" 2 " "	12·00
" 1 " "	7·00	" 2½ " "	18·00
" 1¼ " "	9·00	" 1⅝ " with lower case	15·00

An Illustration of sizes sent on application,

For sale by Hardware Dealers and Stationers.

No. 66 Fulton Street, New York.

HERCULES IRON CUTTER.

No. 1, weight	16 lbs.,	cuts	⅜x2	inch, or	⅜	inch round or square	Price $25·00
No. 2, "	165	"	⅝x3	"	¾	" "	" 50·00
No. 3, "	350	"	¾x4	"	1	" "	" 75·00

This is by far the most powerful Iron Cutter in use which can be worked by hand, having three times the capacity of any other machine which sells at the same price. The No. 3 machine occupies a space of 12x30 inches; when in use additional space must be had for the lever to work in. We send two sets of knives with each machine—one for square and flat, the other for round iron and steel. By using the knives adapted to it, round iron is cut without being flattened. One man can cut the largest size iron named above, but two would be required for steady work. It does not take a minute to change the knives or to shift the machine from large to small sizes.

AUGUSTA, GA., March 3, 1875.

MILLERS FALLS CO.—Enclosed find draft for amount of invoice, January 7. We would have sent the amount before, but did not have an opportunity of trying the Iron Cutter until a few days ago. It is one of the best machines we ever saw. Yours, truly, MOORE & CO.

Office of the ATHENS FOUNDRY AND MACHINE WORKS,
ATHENS, GA., February 18, 1875.

H. L. PRATT, President.—Dear Sir: Enclosed find draft made payable to your order by Messrs. Childs, Nickerson & Co., in payment for Iron Cutter. We have put our Cutter to good service, and find it cuts readily 1½ round, and 3½ x ⅝ square iron. C., N. & Co. are pleased with theirs, say it will save many a blow and cold chisel in their iron house.

Truly, yours, R. NICKERSON, Agent.

We make a satisfactory discount to dealers, and warrant the cutters to do all which we claim for them. Send for prices.

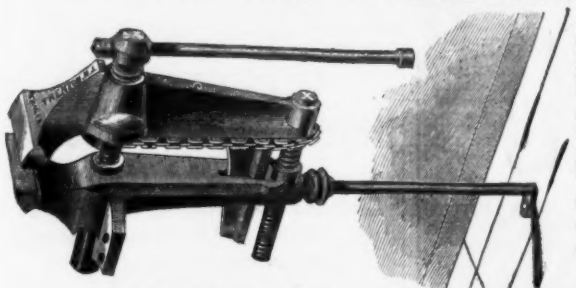
Millers Falls Company,

No. 78 Beekman Street, New York,

Sole Proprietors and Manufacturers of the

Barber Self-Fitting Bit Braces, Millers Falls Vises,
Improved Angular and Ratchet Drilling Machines,
TUBE SCRAPERS, FAMILY TOOL CHESTS,
Patent Adjustable Tool Holders, Mitre Boxes, Ratchet Braces, Breast Drills, etc.

The New Double Screw Parallel "Leg" Vise.



We are now ready to furnish, as the result of more than thirty years' experience, our latest style of Vise—the best yet made. It is **stronger** than any other, whether of Foreign or of American make; always parallel and holding with a tighter "grip." The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping, instead of the heavy, clumsily formed jaws of the cast iron Single Screw Vises of the common "parallel" type, and which, depending upon slide alone for preserving parallelism, can never be screwed up very hard without "jamming" on the sides or breaking.

Our New Vise combines all the advantages of the "Peter Wright" Leg Vise, of strength and lightness, fastening to the floor and bench, and at the same time greatly superior to it; is always perfectly parallel at all points of opening, and never gets out of line. Embodying the same general principle as the well known Chain Vise, so long made by us, we have by new, scientific proportioning of all the parts, and with our recently improved metals for their manufacture, obtained so perfect a tool, that we now *warrant* these Vises for *three years* from date of manufacture stamped upon each.

The Jaws are of best Tool Cast Steel, welded on, file cut and properly hardened. The screws are forged of the best refined iron, and work in *solid cut thread* boxes.

The lower screw maintains the parallel position of the two jaws, by having exact motion with the upper working screw through the connecting chain which regulates it.

The chain is very accurately made of steeled links and rivets, and having no strain of the work upon it, is therefore as durable as all the other parts.

Prices with Special Discounts to the Trade.

No. 1, Jaws	3½ in. x	⅝ in.	Screws	⅝ in.	diameter.	Lever	9 in. long, Opens 4¼ in. $8 00
" 2, "	4⅝ in. x 1	in.	"	1⅜ in.	"	"	13 in. " " 5¼ in. 12 00
" 3, "	5¼ in. x 1⅜	in.	"	1¾ in.	"	"	16 in. " " 6½ in. 17 00
" 4, "	6¼ in. x 1¾	in.	"	1½ in.	"	"	19 in. " " 7½ in. 22 00
" 5, "	7 in. x 1½	in.	"	1¾ in.	"	"	24 in. " " 9 in. 30 00
" 6, "	8 in. x 1½	in.	"	1⅞ in.	"	"	26 in. " " 10 in. 34 00

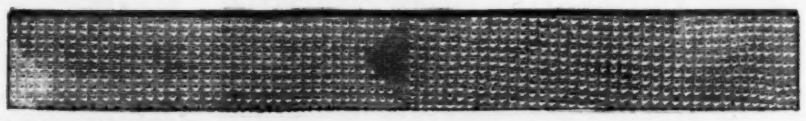
All sizes of these Vises furnished with Swivel Attachment, at an additional cost of $1 to $3. Sold at the General Agencies.

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade).

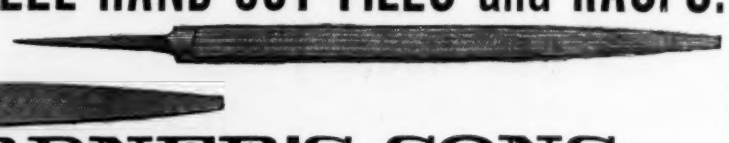
New York.—Messrs. J. CLARK WILSON & CO.—RUSSELL & ERWIN MANUFACTURING COMPANY.—Messrs. HORACE DURRIE & CO. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE.

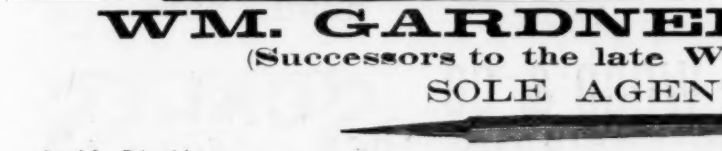
FISHER & NORRIS, Trenton, N. J.

EMPIRE FILE WORKS.



WARRANTED CAST STEEL HAND CUT FILES and RASPS.





WM. GARDNER'S SONS,

(Successors to the late Wm. Gardner,)

SOLE AGENTS,

Send for Price List. No. 575 Grand Street, NEW YORK.

OLIVER'S CHILLED PLOWS.

These implements, though but four years before the public in their present form, show the following remarkable record:

1506 were sold in the season of **1871.** **7472** were sold in the season of **1873.** **30,000** will be made for the season of **1875.**
3049 " " " **1872.** **14,976** " " " **1874.**

For full descriptive circulars, address,

SOUTH BEND IRON WORKS, South Bend, Ind.

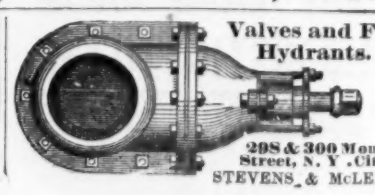
☞ **Two First Premiums awarded by Franklin Institute Exhibition of 1874.**

C. VAN HAAGEN & CO.,

2341 and 2343 Gallowhill Street, PHILADELPHIA, PA.

Manufacturers of Latest Improved Machine Tools, Rotary Shapers, two sizes, Iron Planers, all sizes, Horizontal Drill Attachments, for upright power drills, Self-feeding Portable Drills, hand or power, Expansion Boring Bars, five sizes, Universal Slide Rest, for taper work, Twist Drill Sharpening Machines, automatic and adjustable in every direction, Noiseless Friction Gears, for transmitting up to thirty horse-power.

Send for Descriptive Circulars.



Valves and Fire Hydrants.

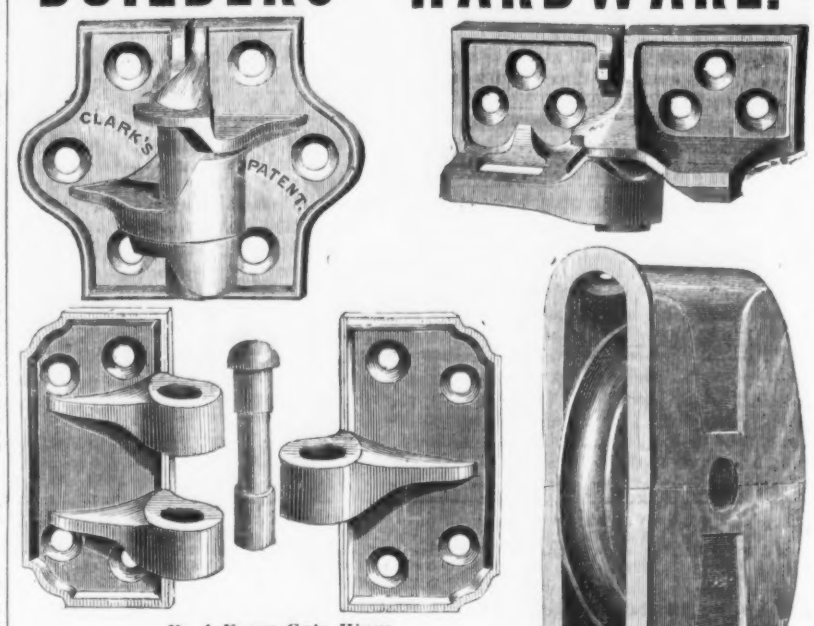
298 & 300 Monroe Street, N. Y. City.

STEVENS & McLEAN.

CLARK & CO.,

MANUFACTURERS OF

BUILDERS' HARDWARE.



No. 1 Upper Gate Hinge.

Send for Illustrated Catalogue and Price List.

BUFFALO, N. Y.

MACK & CO.

Successors to

D. R. BARTON & CO.,

At the Old Stand, 136 Mill St., ROCHESTER, N. Y

Sole Manufacturers of the

D. R. BARTON & CO. BRAND OF

Carpenters' Coopers' and Pump Makers' TOOLS.

Large Knives and Barrel Machinery.

All Tools made by us are stamped D. R. BARTON & CO.,

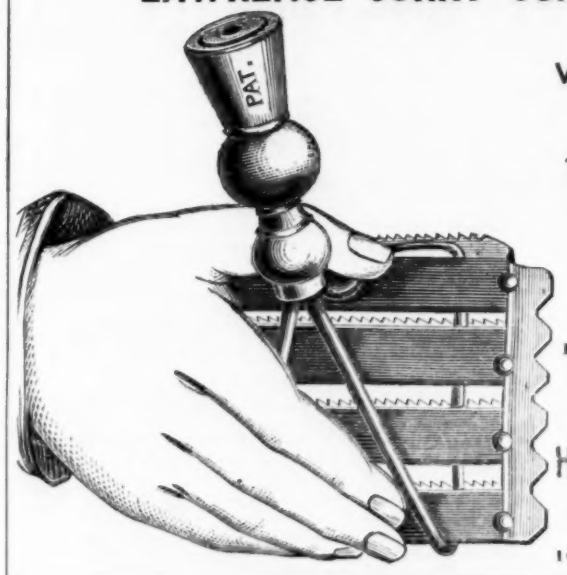
All goods stamped **D. R. Barton & Co.,** are made at the Old Works, and by the old men, from the Best English Steel, manufactured for us by Thos. Firth & Sons and Wm. Jessop & Sons, and fully warranted.

Goods stamped **D. R. Barton** are not made at the Old Works of the company, but by a new stock company, formed about the time of Mr. Barton's decease.

THE PERFECT COMB,

MADE BY THE

LAWRENCE CURRY COMB CO.



WITH

WIRE BRACES,

All Wrought Iron.

The BEST, STRONGEST and Most DURABLE COMB Ever Made.

Patented: May 5, 1874.
Nov. 17, 1874.
Aug. 24, 1875.

FOR SALE BY

Hermann Boker & Co.,

101 & 103 Duane St., N. Y.

WILLIAM A. DODGE,

Commission Hardware,

96 Chambers Street, New York City,

AGENT FOR

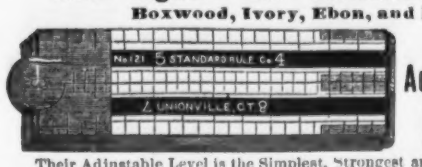
American File Co.'s Files.
J. M. King & Co.'s Stocks and Dies.
Blake Bros.' Butts, Pullies, &c.
Greenfield Tool Co.'s Planes.
M. S. Brooks' Screw Eyes, Hooks, &c.
Watson & Co.'s Cotton, Wool & Horse Cards.
Thrall's Try Squares, Bevels and Rules.
J. P. Verree's Hammers and Edge Tools.
Judd & Blakeslee's Snaps, Sash Fasts, &c.
H. Wilkinson's Mincers and Screw Drivers.
Bliss & Co.'s Hand and Bench Screws.
T. T. Rhodes' Saw Handles.
American Screw Co.'s Rivets and Screws.
Stillman's Saw Sets.
Dodge's Kentucky Cow Bells.
Halroyd & Co.'s Stocks and Dies.
C. S. Griswold, Augers and Bitts.
Romer & Co., Pad Locks.
Wm. Cleveland, Star Faucets.
Bullock's Babbit Metal.
Cowles' Hardware Co. Mincers, &c.
Robbins' Cotton Lines.
Amidons' Braces.

CAST STEEL CORN HOOKS.

The blades are polished and ground to Sharp Cutting Edge ready for use. The handles are of first-class timber with square end, and are firmly strapped and rivetted to the Blade, and are as pronounced by the trade the Best and most durable article in the market. Packed in barrels of seven dozen each.

Sole Agents for STANDARD RULE CO.'S

Boxwood, Ivory, Ebon, and Patent Parly Color



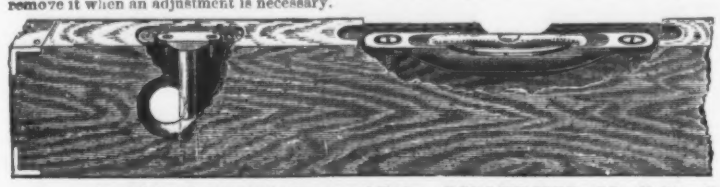
RULES,

Adjustable & Non-Adjustable

PLUMBS & LEVELS.

Their Adjustable Level is the Simplest, Strongest and most Reliable one in the market.

The Spirit Glass is in a metallic case of such a shape at each end as to exactly correspond and bear easily upon perfect curve of a recess formed in the stock for its reception. The case is secured at each end to the stock by a strong screw. When the Level requires adjustment the top plate is removed, one screw is loosened and the other driven until required position is reached. The Plumb Glass is arranged on the same principle. The Top Plate protects the adjustment against thoughtless or mischievous persons, the security being well worth the trouble required to remove it when an adjustment is necessary.



Agents for *COBB & DREW'S* Rivets and Tacks. *RIPLEY MFG. CO.*, Mallets, Mouse Traps, Bung Starts, &c. *ATWATER MFG. CO.*, Carriage Hardware, Clips, Couplings, &c. *VALLEY HARDWARE CO.*, Bow Pins, Bull Rings, Saw Setts, &c. *AMERICAN LOCK MFG. CO.*, More Door Locks, Padlocks, &c. *R. HUMPHREY & CO.*, Spoons, Ferrules and Tin Washers.

MANUFACTURERS OF

Nuts, Washers, Machine, Stove, Carriage, Plow and Agricultural Bolts, &c., &c.

UNION NUT CO., 78 Beekman Street, N. Y.

Factory, UNIONVILLE, CONN.

IRON BLOCK PLANE.

No. 110. 7 1-2 Inches Long, 1 3-4 Inch Cutter. $1·00.

STANLEY RULE AND LEVEL COMPANY, Manufacturers,

Factories, New Britain, Conn. Warerooms, 35 Chambers St., N. Y.

Ecton Mills Genuine London TURKEY EMERY.

TRADE MARK.

ABBOTT & HOWARD, Agents for the United States.

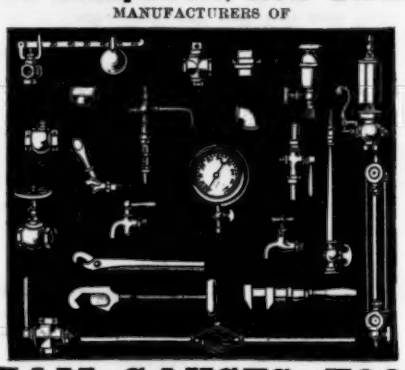
81 John Street, New York. 35 Oliver Street, Boston.

EATON, COLE & BURNHAM CO.,

58 John Street, New York.

MANUFACTURERS OF

Wrought Iron **PIPE,** Cast Iron FLANGED PIPE, **Cast Iron** RADIATORS and BOILERS.



Brass & Iron **STEAM** Gas & Water FITTINGS. PLUMBERS' MATERIALS.

STEAM GAUGES, TOOLS,

And all Supplies used by Machinists, &c.

TRADE PAGE'S PATENT MAY. 8. 1866. MARK

HOUSE ESTABLISHED, 1862.

GEORGE S. FALES,

SUCCESSOR TO

FAIRBROTHER & FALES

Sole Owner and Manufacturer of

Page's Patent Lace Leather,

And Manufacturer of

OAK BELTING,

Also, Picker or Moccasin Leather, for Boot and Shoe Packs.

Angular Belting and Pullies made to order.

PAWTUCKET, R. I.

Ask for Star Stamped Lace Leather.

GOLD MEDAL Non-Extensible Razor Belt.

PATENTED JULY 25, 1871.

RE-ISSUED MAY 13, 1873. and JUNE 9, 1874.

In this Strap the liability of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

BENJAMIN F. BADGER, Manufacturer,

Badger Place, Charlestown, Mass.

Pipe, Fittings, &c.

WROUGHT IRON

INDESTRUCTIBLE ENAMELED PIPE

For Water, Gas, Sewage & Soil Pipe.

Manufactured Solely by

NATIONAL TUBE WORKS CO.,

Also Lap Welded Steam & Gas Pipe & Boiler Tubes.

Tubing & Casing for Artesian, Oil & Salt Wells (with Patent Protecting Coupling),

A Specialty made of Large Wrought Iron Lap Welded Tubes, 8 in. to 14 in. diameter.

MACK'S PATENT INJECTOR, ETC.

Works and Offices at BOSTON, MASS., and McKEESPORT, PENN.

OFFICES AND WAREHOUSES,

New York, 78 William Street. Chicago, 112, 114 & 116 Lake Street.

Cincinnati, 119, 121 & 123 Pearl Street.

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS

For STEAM, WATER and GAS.

Wrought Iron Pipe & Fittings, Plain and Galvanized

PLUMBERS' MATERIALS.

Illustrated Catalogue sent by express to the Trade on application.

Factory, Paterson, N. J. 56 John Street, N. Y.

The Acme Pipe Cutter.

MADE ENTIRELY OF SOLID CAST STEEL.

Cuts Wrought Iron, Brass and Copper Pipes, Round Iron &c perfectly true without leaving burr on pipe, contracting or splitting it. Cuts out a chip similar to a lathe tool. The knife may be removed and ground. Send for descriptive circular to manufacturers.

Pancoast and Maule PHILADELPHIA PA.

WM. ESTERBROOK,

Wholesale Manufacturer of

Coal Hods,

FIRE SHOVELS, Etc.

311 Cherry St., PHILADELPHIA.

CAST IRON PIPES

FOR WATER AND GAS.

Branches Retorts, &c.

Warren Foundry & Machine Co.,

PHILLIPSBURG NEW JERSEY.

GEORGE BARNES & CO.,

Manufacturers, Syracuse, N. Y.

ENCAUSTIC TILES.

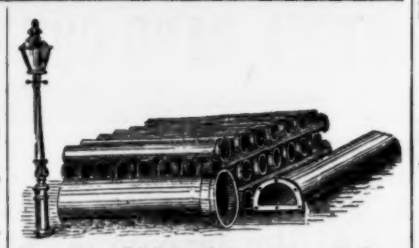
ALEXANDER FINDLAY,

Importer,

99 MAIDEN LANE, N. Y.

Sole Agent in the U. S. for

CRAVEN, DUNNILL & CO., (Limited.)



R. D. WOOD & CO.,

Philadelphia,

Manufacturers of

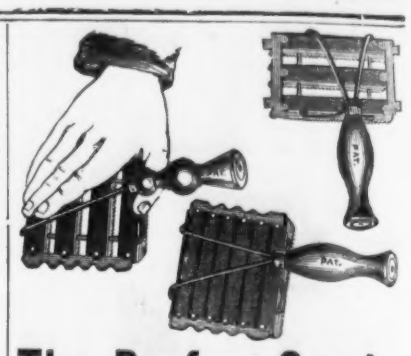
Cast Iron Pipe

FOR WATER AND GAS.

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.



The Perfect Comb.

We call your attention specially to our new patent endless wire frame comb. The result of a long series of experiments, made with a view to meeting all the requirements of a *Perfect Comb*. It is better, stronger, and more durable than any ever before invented. The raised wire shank gives what has never before been attained, viz: a rest and brace for the thumb, in such a position that the hand cannot come in contact with the horse while using the comb. The wire braces which run from the shank over the back to the front teeth give strength and durability in a direction never heretofore attained, and at the same time serve as an extra handle; and when clasped by the fingers in connection with the raised shank the comb is more firmly, easily, and completely held, and with much less fatigue to the hand than is possible in any other formation—in short, it needs but a trial to vindicate its name: **The Perfect Comb.**

THE LAWRENCE COMB CO.

Factory and Office,

382 2d Ave., cor. 22d St., N. Y.

Isaac S. Williams & Co.,

728 Market St., Philadelphia,

WHOLESALE PRICE LIST

OF

Soap Stone Griddles,

HOOPED WITH GALVANIZED IRON.

10 inch Round		per dozen,	$ 6·50
12 "	"	"	9·00
14 "	"	"	12·00
16 "	"	"	15·00
16 "	Oval	"	9·50
18 "	"	"	11·50
20 "	"	"	13·50
22 "	"	"	16·00
24 "	"	"	18·00

Liberal discount to Jobbers.

WM. S. CARR & CO.

Sole Manufacturers of

CARR'S Patent Water Closets,

PUMPS,

Cabinet Wood Work, Vases, &c

106, 108 & 110 Centre Street,

Factory, Mott Haven, New York.

J. AUSTIN & CO.,

168 Fulton Street, N. Y.,

Proprietors and Manufacturers of

WHEATCROFT'S SELF-ADJUSTING

Pipe Wrench,

AND

Scripture's Funnel Top

MACHINE OILERS.

Dealers in

STEAM AND GAS FITTERS TOOLS.

RIEHLE BROTHERS,

Ninth Street, near Coates, Philadelphia.

New York Store, 93 Liberty Street.

Pittsburgh Store, 385 Liberty Street

"Patented" Furnace Charging Scale.

Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.

CHAPMAN VALVE MFG. CO.,

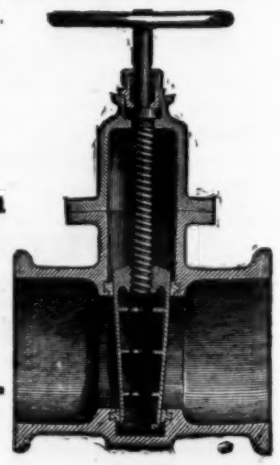
77 Kilby Street, Boston.

Water, Gas AND Steam

VALVES.

Hydrants.

Send for circular



The Iron Age Directory

and index to Advertisements.

HENRY DISSTON & SONS,

Keystone Saw, Tool, Steel and File Works.

Front and Laurel Streets, Philadelphia.

Branch Works, Tacony, Philadelphia. **Branch House, Randolph & Market Streets, Chicago, Ill.**

Our Celebrated CROSS-CUT AND WOOD SAWS.

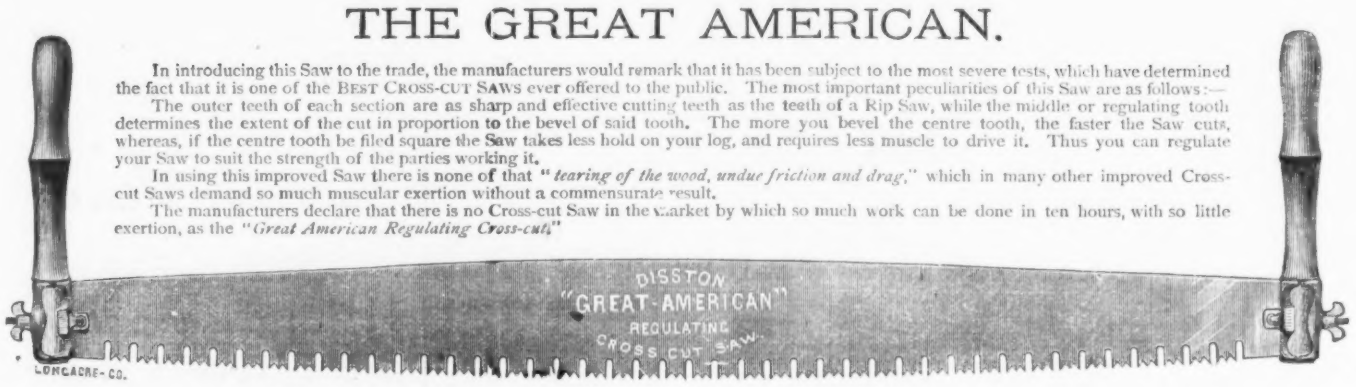
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag,*" which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

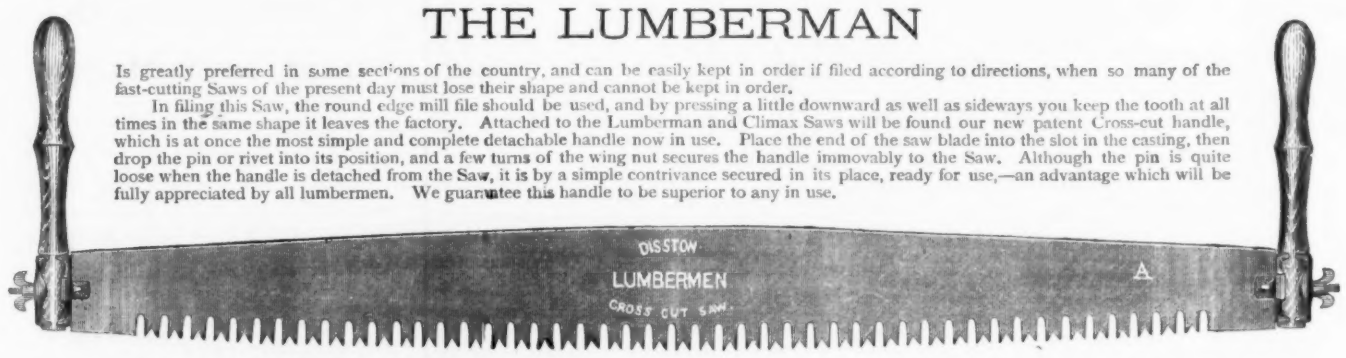
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"

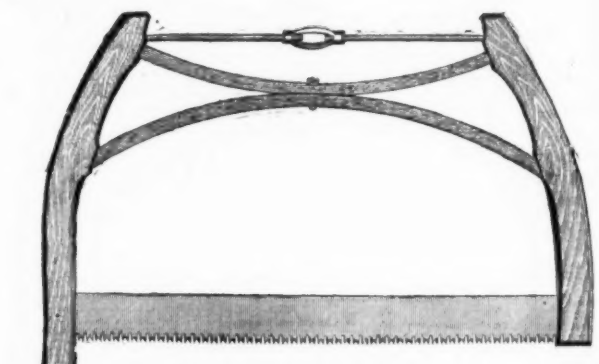


THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



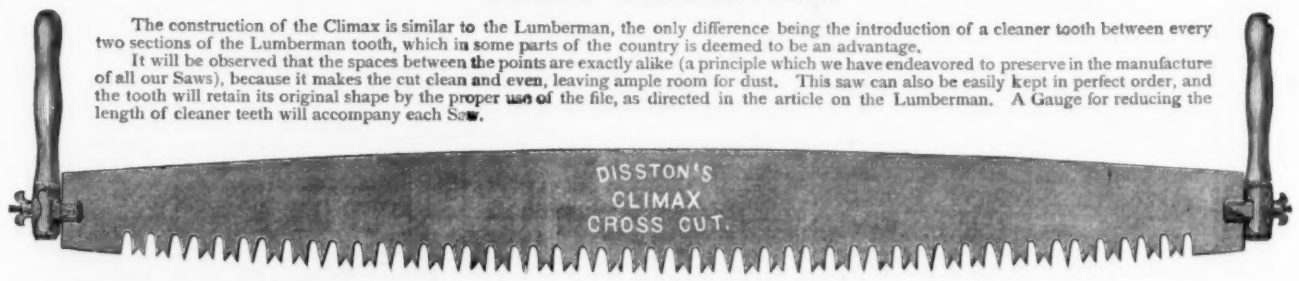


"ARCH FRAME" WOOD SAW.

THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

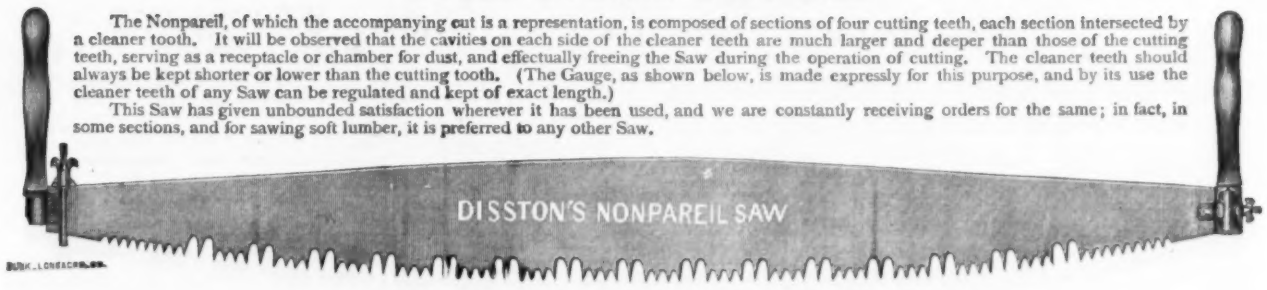
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

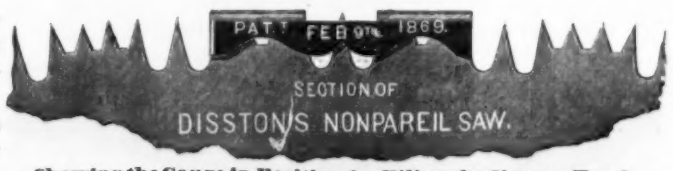
This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



DISSTON'S WOOD SAW FRAME.

GAUGE FOR REGULATING CLEANING-TEETH.

The Cleaning-Teeth of all Saws should be somewhat shorter than the Cutting-Teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the Cutting-Teeth, the Cleaning-Teeth projecting through the opening in center of Gauge. Reduce the projecting points by means of a File, until arrested by the edges of the Gauge, which is made of hardened steel. Thus Tooth after Tooth can be rapidly and correctly reduced to an even length by any unskilled operator.



Showing the Gauge in Position for Filing the Cleaner-Tooth.

New York Wholesale Prices, September 22, 1875.

HARDWARE.

Anvils.
Solid Cast Steel ⅌ ℔ 14c
Wright's ⅌ ℔ gold 11c; over 250 ℔s 11½c, gold
Armitage's Mouse Hole gold 11c
Wilkinson's ⅌ ℔ gold 11c
Eagle Anvils ⅌ ℔ 8c

Apple Parers.
Domestic, Turn Table, Lightning, Hudson's, Reading, Union — $7.75 ⅌ doz
Skeleton Paring, Coring and Slicing $3 00 ⅌ doz net
Bay State, Paring, Coring and Slicing $15 00 dis 10 %
Climax Slicer 8 00

Augers and Bits.
Conn. Valley Mfg. Co., Douglass, Ives, Beecher (French, Swift & Co), Griswold, Challenge — 1st quality dis 40&10 %
Nobles Mfg. Co. dis 40 @ 40&5 %
Cook's d's 40&10&10 %
Diamond Hardware Co. dis 25&10&10 %
Snell Mfg. Co. dis 25 %
Jennings' Bits dis 10 %
Lewis' Single Twist Bits dis 30 %
Andrews' Bits dis 25 %
Griswold's Patent Bits dis 30 %
Expansive Bits, Clark's small, $18; large, $26—dis 15 %
" " Ives' $20 @ $30—dis 30 %
" " Blake's $30—dis 40 %
Hollow Augers, Douglass', Ives', French, Swift & Co. — dis 40 %
" " Bonney's Adjustable ⅌ doz $48—dis 25 %
" " Stearns' ⅌ doz $48—dis 25 %
" " Ives' Expansive each $4·50—dis 40 %
" " Universal Expansive each $4·50—dis 10 %
Gimlet Bits—Screw, $7·50; no screw, $9 dis 20&10 %
Double Cut Gimlet Bits, Shepardson's dis 20 %
" " Ct. Valley Mfg. Co. dis 30&10 %
" " Hartwell's dis 50 %
" " Douglass' dis 20&10 %
" " Ives' dis 30 %
Morse's Bit Stock Drills dis 20 %
L'Hommedieu's Ship Augers dis 20 %
Watrous Ship Augers dis 20 %
Vaughan's Post Hole— 6 in. $23 60; 7, 8 and 9 in. $25 per doz dis 20 %

Awls, Brad Sets, &c.
Awls, Sewing per gross $1·20—dis 15 %
" Shouldered Peg per gross 2·25—dis 15 %
" Patent Peg per gross ·60—dis 15 %
" Shouldered Brad per gross 2·25—dis 15 %
Brad Sets, Aiken's per doz $14·40—dis 25&10 %
" Nos. 42 and 43 dis 45&10 %
" Clark's dis 40&10 %
" Stanley's Excelsior $13 50—dis 25&10 %

Axes.
Brook's per doz $12 00 @ 14 00 net
Blood's per doz $15 00 @ 16 50—dis 20 %
Hunt's ⅌ doz $12 50 @ 14 00
Collins' ⅌ doz 11 00 @ 15 50 net @ dis 5 %
H. Clark's (J. C. W. & Co.) bron'd or red ⅌ doz $10 00 net
Hurd's ⅌ doz 10 50 @ 12 50
Simmons' ⅌ doz 11 00 @ 11 50
Morris' ⅌ doz 12 50 @ 13 50
Red Jacket ⅌ doz 12 00 @ 12 50
Mann's ⅌ doz 11 50 @ 13 00
" Double Bitted ⅌ doz 21 50 @ 22 00
Underhill's ⅌ doz 12 00 @ 13 00
" Crown ⅌ doz 12 50 @ 13 50
John Leverett's ⅌ doz 12 50 @ 15 50
Ten Eyck ⅌ doz $10 00 @ 12 50 net
M. H. Jones & Co. ⅌ doz 10 50 @ 11 50 net
Nobles Mfg. Co. per doz $10 50, net
Elephant per doz $10 50 @ 11 50 net
Axle Grease.—Frazer's ⅌ ℔ 6c.
Balances dis 35 %
Bands.—Plated new list dis 50&5 %
Iron Rim new list dis 25&5 %
Brass (Plated list) new list dis 50, 10&5 %
Oroide new list dis 50&5 %

Bells.
Hand, Light Brass dis 70&10 %
" Extra Heavy dis 40&10 %
" White Metal dis 50&10 %
" Silver Chime dis 20&10 %
" Swiss dis 25 %
" Globe (Cone's Patent) dis 20&10 %
Gong Abbe's dis 20&10 %
" Yankee dis 35&10 %
" Barton's dis 35 %
Crank, Taylor's dis 25 %
" Brook's dis 50 %
" Cone's dis 10 %
" Connel's dis 50&10 %
Lever, Sargent's dis 60&10&10 %
" Taylor's dis 25 %
" Hart, Bliven & Mead Mfg. Co. dis 50&10 %
Pull, " " " dis 50&10 %
" Brook's dis 50 %
" Western dis 25 %
Call dis 15 %
Cow—Common Wrought dis 20&10 %
" Western dis 30&10 %
" " Sargent's dis 50&10&10 %
" Kentucky "Star" dis 20&10 %
" " Sargent's dis 50&10&10 %
" Dodge's Genuine Kentucky, new list—
Nos. 0 1 1½ 2 3 4 5 6 Hog.
$12·00 10·00 9·00 8·00 6·00 5·00 3·50 2·50 5·00—dis 45 %
" Yaw's Genuine dis 35 %
" Texas dis 40 %

Bellows.
Blacksmiths', Common, List of Sept. 15 dis 15 %
" Extra and Pittsburgh Pattern List net
Moulders' dis 20 %
Hand Bellows dis 10 %
Blind Adjusters.—Domestic ⅌ doz $3—dis 20 %
Blind Fasteners.
Mackrell's dis 30 %
Van Sand's, No. 2000, $14·00; No. 3705, $10·50 net @ dis 5 %
Washburn's Patent ⅌ gross $14 00 net
Merriman's new list net
Blind Staples.
Boardman's Patent, ⅜ in. and larger ⅌ ℔ 3[illegible] c
" ⅝ in " 42 c

Blocks.
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list dis 30 %
Burr's dis 10 %
Stanley Rule and Level Co. dis 25&10 %

Bolts.
Cast Iron Barrel, Shutter, &c. dis 60&10 %
Cast Iron Chain dis 60&10&10 %
Wrought Iron Barrel dis 50, 10&10 %
" " Square dis 50, 10&10 %
" " Shutter dis 60&10 %
Wrought Iron Flush, Stanley's dis 15&10 %
" " " Sargent's dis 50&10&10 %
Carriage and Tire, Common dis 75 %
" Norway Iron dis 50&10 %
" R. B. & W. (old list) dis 60 %
" Philadelphia dis 60 %
" Shelton's (old list) dis 60&10 %
Union Nut Company, old list dis 60&10 %
Stove dis 25 %
" R. B. & W. dis 25 %
" Shelton's Shaved Head dis 25 %
Borax 15c. ⅌ ℔

Boring Machines.

	Upright.	Angular.
Hovey's, no Augers	$3·15	$4·00 net
" with Augers	5·00	6·00 net
Douglass', no Augers	3·25	4·00 net
" with Augers	5·00	6·00 net
Parr's, no Augers	5·00	7·50 dis 30 %
" with Augers	7·50	10·00 dis 30 %
Kellogg's, no Augers	5·25	6·75 dis 15 %
Sweets', "	4·75	6·25 dis 15 %
Snell's, "	4·75	6·25 dis 20 %
Phillips', with Augers		10·00 dis 25 %

Mortising Machines, $20·00 each dis 20 %

Bow Pins.
Union Nut Co. new list dis 50&10&5 %
Hotchkiss' dis 50 @ 55 %
Humason, Beckley & Co.'s dis 50&10&5 %
Sargent & Co.'s dis 50&10&10 %

Braces.
Barber's Patent dis 40&5 %
Q. S. Backus dis 40&10 %
Wilson Mfg. Co. dis 10 %
Spofford's Patent dis 50 %
Noble's Patent dis 40&5 %
Ives Novelty dis 40&7½&10 %
" Hamden dis 45&10 %
Common Ball (American) dis 15&10 %
Brackets.—Shelf dis 60&10 @ 65&10 %
Bright Wire Goods dis 65&10&10 %
Bull Rings.—Union Nut Co., new list dis 50&10&5 %
Sargent's dis 60&10 %
Hotchkiss' 2½ in., $2·25 net

Bung Hole Borers.
Common and Ring dis 20&10 %
Ives' Tap Borers dis 10&10 @ 25 %
Enterprise Mfg. Co. dis 20 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co dis 20&10 %
Bradley's dis 25 %
Beatty's dis 20 %
2 3 4 5 6 7 8 8
$19·00 $21·00 $24·00 $27·00 $30·00 $31·50 $36·50 $40·00
Hart Mfg. Co. dis 45&10 %
0 1 2 3 4 5 6
$25·25 $29·75 $34·25 $38·75 $43·25 $48·50 $54·00

Butts.
Wrought Brass dis 30 %
Cast Brass dis 20 %
Common Cast, not Drilled.
Fast Joint, Narrow New list July dis 30&10 %
" Broad " dis 40&10 %
" Jap'd " dis 35&10 %
Loose Joint, Narrow and Broad " dis 50&10 %
" " Jap'd " dis 45&10 %
Parliament Butts & Mayer's Hinges " dis 40&10 %
Loose Pin " dis 45&10 %
" Japanned " dis 55&10 %
" " Plated Tips " dis 50&10 %
Drilled and Wired.
Fast Joint, Narrow New list July 1, dis 25&10 %
" Broad dis 35&10 %
" Jap'd, with and without Acorns " dis 30&10 %
Loose Joint " dis 45&10 %
" Jap'd with and without Acorns " dis 45&10 %
Parliament and Mayer's Hinges " dis 35&10 %
Loose Pin " dis 40&10 %
" Japanned " dis 50&10 %
" " Plated Tips " dis 45&10 %
Union Mfg. Co., Figured Enameled L. J. dis 55&10 %
Union Mfg. Co., Nickel Pl. L. J. Capped Iron and Bronze dis 33⅓&10 %
" " Boston Finish, Plain, without Acorns dis 80&5 %
" " Boston Fin. with Iron Acorn dis 75&5 %
" " " Silvered " dis 65&5 %
Wrought Iron.
Fast Joint, Narrow, Lt. and Regular dis 30 %
" Broad dis 35 %
Loose Joint, Narrow and Broad dis 35 %
Table Butts, Back Flaps, &c. dis 30 %
Inside Blind, Regular dis 30 %
" Light dis 40 %
Loose Pin, Wrt dis 35 %
Am. Spiral Spring Butt Co., list May 1st dis 25 %
Union Spring dis 20 %
Blind Butts, Parker dis 65 %
" Palmer dis 40 %
" Seymour dis 55&10 %
" Shepard dis 60 @ 60&10 %
" Lull & Porter dis 60 %
" Nicholson dis 45&10 %
" Huffer dis 33⅓&10 %
" Garretson, No. 1 dis 65 %
" Clark's, Nos. 1, 3 and 5 dis 65 %
" Clark's No. 2 dis 65&10 %
" " Nos. 2 4, 4½, 6, 8, 10 dis 45 %

Caps—Percussion, per 1000.
G. D. 37 @ 40c
Ely's E. B. 1-4s, 58c.; 1-10s, 70c. gold
" Double Waterproof, 1-4s, $1·45; 1-10s, $1·52½c., gold
Colt's 1-10s 80c gold
Carpet Sweepers.
Union each $2 75 net
Welcome each 2 75 net
Cartridges.—Metallic dis 55&5 %
Cards.—Horse and Curry dis 30&10 %
Cotton dis 10&10 %
Wool dis 15&10 %
Carpet Stretchers.
Cast Steel, Polished per doz $5·00 dis 30 %
Cast Iron, Steel Points per doz $2·00 dis 45&5 %
Casters.
Bed dis 30&10 @ 40 %
Plate and Shallow Socket dis 40&10 %
Deep Socket dis 35 @ 40 %
Cattle Leaders new list dis 60&10 %
Chain.
English Coil net gold
⅌ ℔ 11¼ 8⅝ 7⅛ 7½ 7⅛ 7c
[illegible] [illegible] 5-16 ⅜ 7-16 ½
Trace, 6½-10-2 by the cask, ⅌ pair, gold 55c
Trace, 7-10-2 by the cask, ⅌ pair, gold, 62c
German Halter Chain dis 25 % gold
German Coil dis 25 % gold
Galvanized Pump Chain ⅌ ℔ 13c
Jack Chain, Iron dis 50&10 %
" Brass dis 40&10 %
Chalk.
White ⅌ gross, 57c net
Red ⅌ gross, 90c net
Blue ⅌ gross, $1·00 net
White Crayons ⅌ gross, 16½c net
Chisels.
Socket Framing, Douglass, Extra dis 60&10&10 %
" Crossman dis 50&15&10 %
" Buck Bros. equivalent to dis 50&17½ %
" Hart Mfg. Co. dis 60&10 %
" Merrill dis 60&10 %
" Firmers, Douglass, Extra dis 60&10 %
" Crossman dis 50&10&10 %
" Buck Bros. equivalent to dis 50&15 %
" Hart Mfg. Co dis 60&5 %
" Merrill dis 60 %
Socket Corner dis 60&10 %
Tanged Firmers dis 40&10 %
" Butcher's $5·50 to £ gold
" Newbould's $5·50 to £ gold
" Spear & Jackson's $5·50 to £ gold
" Buck Bros (Shank) $5·50 to £ gold
Clamps.
Cabinet dis 60&10 %
Gray's dis 20 %
Lambert's dis 20 %
Providence Tool Co. dis 10 %
Clips, Axle.
Norway or Best dis 40 %
Superior dis 50 %
"Star," Superior Philadelphia dis 45&5 %
Coal Shovels.
Edgar's Pat. "Gem," Short and Long H'dled dis 15 %
Iron Handled ⅌ doz, $ 85 @ 1 25
Wooden Handled ⅌ doz, 1 00 @ 2 00
Coal Hods.—Smith, Burns & Co. dis 15 @ 25 %
14 15 16 17 18 inch.
Japanned $6·00 6·35 6·75 7·50 8·00 per doz.
Galvanized 9·50 10·00 10·75 11·50 12·50
Morning Glory Funnel Hods—
No. 15 16 17
Japanned $9·00 10·50 12·00 per doz
Galvanized 13·00 14·50 16·00 "
Sidney Shepard & Co.'s new list dis 10 %
Cockeyes 1¼ in., 28c.; 1⅜ in., 33c.; 1½ in., 37c. net
Cocks.
Brass Racking dis 35 %
Lock and Globe dis 35 %
Lever Bibbs dis 35 %
Ale and Beer dis 25&10 %
Coffee Mills.
Board and Box dis 15 @ 20 %
Brighton dis 20 %
Increase Wilson's dis 20 %
Selsor's Pat $9·50, $10·50—dis 25 %
American (Enterprise Mfg. Co.) dis 20 %
French Steel dis 15 %
The Swift dis 20 %
Compasses and Dividers.
Bemis & Call Co.'s dis 35&10 %
Cook's dis 15 %
Excelsior dis 30 %
Peck Stow & Wilcox dis 25 %
Miller's Patent dis 25 %
Coopers' Tools.
Bradley's dis 15 @ 20 %
Chas. E. Little dis 20 @ 25 %
Swan & Brombacher dis 15 @ 20 %
Corkscrews dis 25 %
Corn Knives and Cutters.
Bradley's dis 10 %
Crow Bars.
Cast Steel ⅌ ℔ 11c. net
Iron, steel points ⅌ ℔ 5c
Crucibles.—Gautier & Co. ⅌ No. 5½c
Curling Irons, &c.
⅛, ⅜, ¼ in., $1·80, $2·00, $2·40 dis 10 %
Curling Tongs ⅌ doz $8 50—dis 15 %
Pinching Irons ⅌ doz 7 50—dis 20 %
Curry Combs.
Hotchkiss' & Kellogg's, Iron & Brass, old list dis 40 %
Fitch's (List of No. 2[illegible], $1) dis 20&10 %
Rubber ⅌ doz, $9·00—dis 15 %
Wood Tooth (Fuller Bros.) per doz $2·25 net
Curtain Pins.—Silvered Glass, old list dis 52½ @ 55 %
Cutlery.
American Table { Meriden } New list Jan. '75, dis 25 %
American Pocket { Cutlery Co } dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co. dis 20&10 %
Am. Miller Bro.'s Cutlery Co. dis 25 %
Naugatuck Cutlery Co. dis 25 %
Dippers.
Britannia per doz 7·50—dis 30 %; by bbl. dis 33⅓ %
Cocoa, Plain per doz $3·25—dis 20 %
" Rimmed per doz 3·75—dis 20 %
Dog Collars.
Embossed Gilt dis 20 %
Leather dis 20 %
Brass dis 25 %
Door Springs.
Gray's $7·50 ⅌ doz—dis 55 @ 60 %
Torrey's Patent $7·50 ⅌ doz—dis 60 %
Johnson's per doz $3 00 @ 4 00
Philadelphia 5 in., $5·00; 8 in., $7·00 dis 15 %
Palmer's Japanned No. 6 ⅌ doz $5·00; " Coppered " 6·00; " Silvered " 8·00 } dis 20 %
Challenge.— Japanned No. 9, per doz $4·00; No. 7, " 5·00; No. 6, " 6·00 } dis 40 %
Gem.—No. 1 large, Japanned per doz $4·00; No. 2 medium per doz 3·50; No. 3 small per doz 3·00 } dis 10 %
Barker's Concealed dis 12½ %
Drawing Knives.
Crossman's No. 1 dis 50&15&10 %
Douglass, Extra dis 60&10&10 %
Hart Mfg. Co., No. 1 dis 60 %
Merrill dis 60&10 %
Nobles Mfg. Co dis 15 %
Bradley's dis 25 %
Adjustable Handle dis 15 %
Drills and Drill Stocks.
Blacksmiths' each $2 60 net
" Self-Feeding each $8 00 net
Breast, P. S. & W. dis 45 %
" Miller's Falls dis 25 %
" Aiken's dis 25&10 %
" Hotchkiss dis 10 %
" Wilson's dis 10 %
Ratchet, Merrill's dis 20 %
" Ingersoll's dis 35 %
" Whitney's dis 20 %
" Weston's dis 30 %
" Moore's Triple Action dis 20 @ 25 %
Wilson's Drill Stocks dis 10 %
Automatic Boring Tools each $2·75—dis 20 %
Drill Chucks.—The Danbury each 10·00, dis 20 @ 25 %
Beach Patent (Morse) dis 15 %
Egg Beaters.
Monroe's 8 in. 10 in. Per doz $8·00 9·00 dis 10 %
Dover ⅌ doz $6·00—dis 10 %
National ⅌ doz $4·50—dis 20 %
Peerless ⅌ doz $3·00—net
Emery.
Genuine Chester—Regular Nos. ⅌ ℔ 6c; " Flour and FF ⅌ ℔ 4c } dis 10 %
Washington Mills—Regular Nos. ⅌ ℔ 8c
" Flour ⅌ ℔ 5c
Enameled and Tinned Ware.
Kettles dis 30 @ 40 %
Sauce Pans dis 25 %
Glue Kettles dis 20 @ 25 %
Tinned Saucepans dis 25 %
Escutcheons.
Door Lock Same discounts as Door Locks
Brass Thread dis 60&10 %
Wood dis 25 %

Faucets.
Fenn's dis 50 %
" Cork Stops dis 40 %
Star dis 55&10 %
Frary's Patent Petroleum dis 15&10 %
Taylor's Pattern " dis 20&10 %
Wood and Metallic dis 40 %
Wood, Cork Lined dis 60&10 %
Enterprise Mfg. Co., Self-Measuring dis 20 %
Felloe Plates ⅌ ℔ 15c; dis 25 %
Files.
American File Co. $5 00 to £ currency—dis 15 @ 20 %
Arcade File Works $5·00 to £ currency
Auburn File Works $5 00 to £ currency
Nicholson new list, Jan. 1, 1875, net @ 5 %
Hartford File Co $5 50 to £ currency—dis 10 %
L. B. Heller & Co. $5 00 to £ currency
Heller & Bros $5 00 to £ currency
"Western" 5 00 to £ net
Wheeler, Clemson & Co. $5 00 to £ currency
Rothery's $5 to £ currency
J. & Riley Carr 5 25 to £ gold
" Horse Rasps 5 50 to £ gold
Stubs' 8 50 @ 9 00 to £ gold
Butcher's 5 25 to £ gold
Walter Spencer & Co.'s "Diamond" 5 00 to £ gold
Spear & Jackson's 5 00 to £ gold
Jowitt's 5 00 to £ gold
Newbould's 5 25 to £ gold
W. K. & C. Peace's "Imperial" 5 25 to £ gold
R. Ibbotson 5 00 to £ gold
Turton Bros. & Matthews $5 50 to £ currency
Fisher's 4 75 to £ gold
Goodlad's 4 00 to £ gold
Moss & Gamble 5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.) 5 00 to £ gold
" " Horse Rasps 5 25 to £ gold
"Philo Sheffield," P. T. Co. 5 00 to £ gold
Limet & Co. (French) 5 00 to £ gold
Fluting Machines.
Mrs. Coles' Pony, 4 in., $4·75; 5 in., $5; 6 in., 5·50; 7 in., $6
Knox, with 4-inch Rolls 3 80 each net
" " 6 " 4 30 each net
" " 8 " 5 75 each net
O. K. 6 50 each net
Peerless, 4-inch Rolls 4 00 each net
" 5 " " 4 75 each net
Excelsior, No. 1 4 75 each net
" No. 2 6 50 each net
Diamond 7 50 each net
Champion, 6 inch rolls 6 50 each net
" 4 inch rolls 5 00 each net
Climax 7-inch Rolls 8 00 each net
" 4½ " 6 50 each net
Empire 4 00 each net
Eureka, No. 1, 7-inch Roll 8 00 each net
" No. 2, 5-inch Roll 6 00 each net
K. F. M., 4½-inch Roll 5 50 each dis 15 %
" 6-inch Roll 6 00 each dis 15 %
Myers' Fashion Fluter, 4½-inch Rolls 2 75 each net
" Convex Brass Fluter, Sad Iron attachment per doz $15·00
Domestic Fluter $1·50 each net
Geneva Hand Fluter $15 00 per doz net
Fluting Scissors dis 25&10 %
Forges.
"Empire" (W. P. Kellogg & Co.) dis 20 %
Forks.
Hay, Manure & Spading dis 33⅓ %
Plated A 1 dis 50 %
Fry Pans.
Burnished, P. S. & W., new list dis 50 %
⅌ doz $3·00 3·75 4·25 4·75 5·25 6·00 7·00 8·00 9·00
No 0 1 2 3 4 5 6 7 8
Smith, Burns & Co., "Excelsior" Polished dis 35 %
⅌ doz $3·70 4·00 4·70 5·30 6·00 7·00 8·00 9·00
No 1 2 3 5 6 7 8
Gas Stoves.
Tiff & Howard dis 20 %
Gauges.
Marking dis 45&10 %
Wire dis 10 %
" Smith's Patent per doz $18·00, dis 40 %
Gimlets.
Nail and Spike dis 25&10 %
Double Cut, Shepardson's dis 20 %
" " Hartwell's dis 40 %
" " Ives' dis 25 %
" " Douglass' dis 20&10 %
Grind Stone Fixtures
Sargent's Patent dis 65&10 %
Reading Hardware Co. dis 65&10 %
J. F. Green & Bro. dis 40 %
Hart Mfg. Co.'s dis 60&5&10 %
Rick Bros dis 45&5 %
Hammers.
Emmet Hammer Co.'s Handled dis 25 %
" " Sledge & Stone ⅌ ℔ 40c.; dis 40 %
Humason & Beckley Mfg. Co. dis 16⅔&10 %
Maydole's dis 12 %
Cheney's net @ dis 5 %
Verree dis 5 %
Yerks & Plumb dis 20 %
Magnetic Tack dis 25&10 %
Warner & Noble's dis 10 %
Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4 00 per pair; " Leg Irons $8 50 per pair } dis 25 %
Providence Tool Co.'s Hand Cuffs $15 per doz; " " Leg Irons 25 " } dis 10 %
Handles.
Door or Thumb Latches—
Nos. 0 1 2 3 4
Per doz $1·80 1·00 1·18 1·35 1·50—dis 60 %
Roggin's Latches 40c. @ 50c. net
Bronzed Iron Drop Latches per doz $1·30 net
Wrought Chest dis 60&10 %
Surface Chest dis 65&10&10 %
Flush Chest dis 60&10&10 %
Lifting dis 60&10 %
Coffin dis 50&10 @ 60&10 %
Saw and Plane dis 25&10 %
Hammer and Hatchet dis 10 %
N. Carolina Handle Co. dis 15 %
Brad Awl per gross $3 50—dis 20&10 %
Hickory Firmer Chisel, ass'td " 5 25—dis 20&10 %
" " " large " 6 50—dis 20&10 %
Apple " " ass'td " 6 00—dis 20&10 %
" " " large " 7 50—dis 20&10 %
Socket " " ass'td " 8 50—dis 20&10 %
" Framing " " " 7 00—dis 20&10 %
File " " 4 00—dis 20&10 %
Auger " " 6 50—dis 20&10 %
" large " 8 00—dis 20&10 %
Patent Auger, Ives' dis 25&10 %
" " Douglass' per set $1 25—dis 10 %
" " Swan's per set $1 00—dis 30&10 %
Hangers.
Barn Door dis 65&10 %
"Anti-Friction" dis 40 %
Novelty dis 30 %
Challenge dis 40 %
Harness Snaps.
Henshaw's dis 25&10 %
Judd's dis 40 %
Fitch's (Bristol) dis 30 %
Hotchkiss' dis 10 %
Andrews' dis 25 %
Sargent's dis 50&10 %
New York Wire dis 20&20 %
Hatchets.—Isaiah Blood dis 15 %
Shingling, Nos. 1 2 3 ⅌ doz $7 25 8 00 8 75
Claw, " 1 2 3 ⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ⅌ doz 7 50 8 00 8 50
Hunt's dis 10 %
Shingling, Nos. 1 2 3 ⅌ doz $7 25 8 00 8 75
Claw, " 1 2 3 ⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ⅌ doz 7 50 8 25 9 00
Hurd's dis 25 %
Shingling, Nos. 1 2 3 ⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3 ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ⅌ doz 8 00 8 50 9 00
Newark's Edge Tool Co.'s dis 25 %
Shingling, Nos. 1 2 3 ⅌ doz $6 50 7 00 7 50
Claw, " 1 2 3 ⅌ doz 7 25 7 75 8 25
Lathing, " 1 2 3 ⅌ doz 6 50 7 00 7 50
Yerkes & Plumb dis 20 %
Shingling, Nos. 1 2 3 ⅌ doz $7 00 7 50 8 00
Claw, " 1 2 3 ⅌ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ⅌ doz 7 00 7 50 8 00
Simmon's dis 15 %
Shingling, Nos. 0 1 2 3 ⅌ doz $7 50 8 00 8 50 9 00
Claw, " 1 2 3 ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ⅌ doz 8 00 8 50 9 00
Broad, " 1 2 3 ⅌ doz 9 00 10 00 12 00
" " 4 5 6 ⅌ doz 14 00 16 00 18 00
" " 7 8 ⅌ doz 20 00 22 00
Elephant dis 30 %
Shingling, Nos. 1 2 3 ⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3 ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ⅌ doz 8 00 8 50 9 00
J. P. Verree & Co. dis 5 %
Shingling, Nos. 1 2 3 ⅌ doz $7 00 7 50 8 00
Claw, " 1 2 3 ⅌ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ⅌ doz 7 00 7 50 8 00
Underhill's dis 10 %
Shingling, Nos. 1 2 3 ⅌ doz 7 25 8 00 8 75
Claw, " 1 2 3 ⅌ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ⅌ doz 12 00 11 00 13 00
M. H. Jones & Co. dis 25 %
Shingling, Nos. 1 2 3 ⅌ doz $8 00 8 50 9 00
Claw, " 1 2 3 ⅌ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ℔ doz 8 00 8 50 9 00
Hay Knives.—"Lightning" per doz $20·00 net
Hinges.
Gate, Western ⅌ doz $6·25—dis 60&10 %
" N. E. ⅌ doz 11·25—dis 60&10&10 %
" N. Y. State ⅌ doz 7·20—dis 60&10 %
Rolled Plate dis 65&10 %
" Raised dis 65&10 %
Wrought Strap and T dis 33⅓&10&5 %
Providence Plate. { 6 and 8 in. 11c ⅌ ℔; over 8 in. 9½c ⅌ ℔ } dis 30 %
Screw Hook and Strap { 8, 10, 12 in. 6½c; 14 to 36 in. 5½c } net
Heavy Welded Hook { 8 to 12 in., 6½c; 14 in. & up, 6c } net
Screw Hook and Eye { ⅜ to 1 in., 8½c; ⅝ in. 9½c; ½ in. 11½c } net
Hoes.
Solid Shank, C. S. ⅌ doz $8 00—dis 35 %
Socket ⅌ doz 9 00—dis 35 %
Riveted Eye ⅌ doz 5 00—dis 35 %
Grub dis 25 %
Planters net @ dis 5 %
Scovill add 33⅓ %
Scovill Pattern net @ dis 5 %
Lane's C. S. Cresent, American Pattern list net
" " " Scovill Pattern add 10 %
Hooks.
Bird Cage dis 60&10 @ 70&10 %
Cotton dis 50 %
Belt dis 55 @ 60 %
Bench—Hotchkiss' $5 00 ⅌ doz dis 10 %
" Weston's No. 1, $6·00; No. 2, $7·00 per doz net
" McGill's $3 00 per doz, dis 10 %
" Skinner's per doz $6·25, dis 20 %
Clothes Line, Harness, Wardrobe, Hat and Coat, Ceiling } Hart's list d's 60&10&10 %; Sargent's list dis 60&5&10 %; Reading list dis 35&10 %
Wrought Staples and Hooks and Staples dis 70&10 %
Wire Screw Hooks and Eyes dis 65&10&10 %
Grass dis 20 %
Whiffletree—Patent dis 35 %
Hooks and Eyes—Malleable Iron dis 60&10&10 %
" " Brass dis 60&10&10 %

Horse Nails.

Nos.		5	6	7	8	9	10
American Pressed	⅌ ℔	22c	20c	20c	20c	20c	20c
Ausable	"	30c	27c	25c	24c	23c	22c
" P't'd & Pol'd	"	31c	28c	20c	26c	24c	23c
" " & Blued	"	32c	29c	27c	26c	25c	24c
Cortland	"	29c	26c	24c	23c	22c	21c
Buffalo Forged	"	31c	28c	26c	25c	24c	23c
Globe, P't'd & Pol'd	"	31c	28c	26c	25c	24c	23c
National, Pointed and Polished, Pat. Fin	"	29c	25c	23c	22c	21c	20c
National, Pointed and Polished, Ex. Fin	"	30c	27c	25c	24c	23c	22c
Perkins' Pointed and Polished	"	30c	27c	25c	24c	23c	21c
Perkins' Pointed and Blued	"	31c	28c	26c	25c	24c	22c
Putnam	"	32c	28c	26c	25c	24c	23c
Vulcan, P't'd & Blued	"	33c	30c	28c	27c	26c	25c

Star Brand, 16c.; Morgan 14c
Putnam 2000 lbs., dis 5 %
Ausable, Am. Pressed, Perkins, Globe, National and New London 1000 lbs., dis 5 %
Vulcan 1000 lbs., dis 7½ %
Vulcan and Brundage 500 lbs., dis 5 %
Horse Shoes.
Burden ⅌ keg, $5·12½
R. I. Horse Shoe Co., Perkins Pattern ⅌ keg, 5·12½
" " R. I. Pattern ⅌ keg, 5·87½
Mule Shoes ⅌ keg, 6·12½
Perkins' Snow ⅌ keg, 6·62½
Boston Rolling Mills Hand Made ⅌ ℔ 8c
Kettles.
Brass ⅌ ℔ 45c net
Enameled dis 30 @ 40 %
Knives.
Ames' Butcher Knives dis 20 %
" Shoe " dis 15 %
" Bread " ⅌ doz $1·50—dis 15 %
Hay and Straw, "Wadsworth's" dis 20 %
Table and Pocket See Cutlery
Knobs.
Carriage (Jap'd 80 cents per gross) dis 60&10 %
Base—Common net
" Plush Tip dis 10 %
" Elastic End, No. 3 dis 30&10 %
Door, Mineral ⅌ doz $2·25; " Por. Jap'd ⅌ doz 3·00; " " Plated ⅌ doz 7·00; " " Por ⅌ doz 7·50 } dis 40&5&2 %
Furniture, Plain 75c gross inch, dis 10 %
Ladles.
Melting, Hart's dis 55&10 %
" Sargent's dis 50&10 %
" Reading dis 15&10 %
Lanterns.
Tubular No. 0, $11·00; No. 1, $14·00 net
Peerless No. 5, per doz $11·75—dis 10&10 %
Brady's Patent dis 10 & 10 %
Ætna dis 10 & 10 %
Yankee dis 10 & 10 %
De Beque dis 10 & 10 %
Lard Presses.
Draw Cut, 14 inch each $65 00—dis 20 %
Lemon Squeezers.
Porcelain Lined per doz $7 00, dis 15 %
Eureka, Tinned per doz, $3·00 dis 10 %
Dunlap's Improved per doz $6·00 net
Lines.
Linen Fish dis 20 %
Cotton Chalk dis 40 @ 45 %
Sil. Lake Chalk Nos. 0, 1, 2, 3, $6, 6·50, 7, 7·50, dis 20 %
Mason's dis 20 %
Locks and Latches.
Cabinet—Gaylord dis 25 %
" Eagle dis 25 %
Trunk " dis 25 %
Langstroth & Crane, Round Key dis 40 %
" " Flat Key dis 33⅓ %
Barnes & Deitz dis 25 %
Continental dis 25 %
Shepardson's dis 20 %
American Lock Co. dis 33⅓ %
Plate new list dis 40&2 %
Yale Lock Co. dis 40 %
Sargent & Greenleaf dis 20 %
Trenton, Branford, Norwich, Russell & Erwin, Norwalk, Nashua, Mallory, Wheeler & Co., P. & F. Corbin, Parker & Whipple, Jacobus & Nimick Mfg. Co. } dis 40&5&2 %
Padlocks, Russell & Erwin; " Mallory, Wheeler & Co.; " Wm. Wilcox & Co. } dis 40&5&2 %
" Romer's dis 5 %
" Vulcan Hardware Co. dis 20 %
" New York Lock Co. dis 20 %
" J. H. McWilliams dis 5 %
" Scandinavian Jail dis 10 @ 15 %
" Barnes & Deitz dis 25 %
" D. K. Miller Lock Co. dis 30 %
" Penn Lock Works dis 20 %
Mallets.—Hickory and Lignumvitæ dis 20 %
Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 2 3 4 — ⅌ doz. $14 00 $17 00 $19 00 $30 00 dis 20 %
Miles Challenge Nos. 1 2 3 — ⅌ doz. $22·00 $30·00 $40 00—dis 30 %
Perry's (P. S. & W.) Nos. 200 300 400 — ⅌ doz. $22·00 $27·00 $40·00—dis 10 %
Woodruff's (P. S. & W.) Nos. 100 150 — ⅌ doz. $15·00 $18·00—dis 20 %
Hales' Nos. 11 12 13 — ⅌ doz. $27·00 $33·00 $42·00—dis 35&[illegible]
Draw Cut Nos. 5 6 7 — Each $56·00 $90·00 $250·00—dis 20 %
American dis 25 @ 25&5 %
No. 1 2 2½ 3 4 B 5
Each $6·00 $9·00 $12·00 $15·00 $30·00 $60·00 $75·00
Molasses Gates.
Stebbins' dis 62½&10 %
" Tinned ends dis 40&10 %
Bush's dis 20 %
Lincoln's dis 50&10 %
Weed's dis 15 %
Mortars and Pestles.
Iron net
Nail Pullers.
Taft's per doz $24·00 net
Nails 10d., $3·10 @ $3·25 net
Nuts and Washers.
Nuts large, 6c; small, 8c off list.
Washers large, 8½c; small, 10½c off list.
Oilers.
Miller's Zinc, Brass and Copper dis 40 %
Sheet Metal Screw, Zinc, Brass and Copper dis 40 %
Olmsted's dis 25&10 %
Broughton's dis 25&10 %
Malleable per doz $5 00 dis 10 %
Prior's Patent or "Paragon" dis 40 %
Ox Shoes.
Concave ⅌ ℔ 13c net
Ox Balls dis 60&10 %
Pencils
Faber's Carpenters' net
" Round Gilt ⅌ gross $6 00 net
Dixon's Lead ⅌ gross $4·50 net
" Lumber ⅌ gross 9·00 net
Picture Nails and Knobs.
Brass Head dis 60&10 %
Porcelain Head dis 55&10 %
Richards' Patent dis 40 @ 40&10 %
Judd's dis 60&10 %
Pinking Irons per doz $2 75—dis 65 %
Planes and Plane Irons.
First Quality dis 35 %
Second Quality dis 50 %
Bailey's Patent Adjustable dis 25&10 %
Plane Irons, Butcher's $5 50 to £ gold—new list
" Buck Bros $5 50 to £ gold
" Bailey's Patent dis 25&10 %
" Auburn Tool Co.'s dis 25 %
" Greenfield Tool Co. net list
" Middletown Tool Co. net list
" Ohio Tool Co. dis 10 %
" Spear & Jackson's 5 50 to £ gold—new list
" Sandusky Tool Co dis 10 %
Plow Bits, Greenfield Tool Co. dis 10 %
Pliers and Nippers.
Button's Patent dis 33⅓ %
Hull's Patent Nippers dis 25 %
Leach's Patent Wire Cutters per doz $6 50—dis 15 %
Gas Pliers dis 25 %
Plumbs and Levels
Stanley R. & L. Co.'s Pat. Adjustable dis 65&10 %
" " " Non-Adjustable dis 65&10 %
Chapin's dis 66⅔&1[illegible]
Standard Rule Co.'s New Adjustable dis 60&10 %
Standard Rule Co.'s Non-adjustable dis 60&10&10 %
Pocket Levels dis 50&10 %
Johnson's Patent Adjustable dis 60&10 %
Pulleys.
Hot House and Tackle dis 60&10 %
Jap'd Screw dis 60&10 %
Brass Screw dis 60&10 %
Jap'd Side dis 60&10 %
" Clothes Line dis 60&10 %
Hay Fork per doz $4 50 @ 5 00, dis 10 %
Pumps.
Douglas Cistern, etc. new list dis 25 %
" S. & F. new list dis 20 %
Union Mfg. Co's. Cistern and Pitcher dis [illegible]
" " " Rams dis 20 %
" " " Garden Engines dis 10 %
Cucumber (Burlingham & Puray)— 5 ft. No 3, with 12 ft. pipe $4·00 net
6 ft. No. 1, with 12 ft. pipe 4·50 net
From 6 to 36 ft. add 20 cents per ft.
Pipe, 8c. per ft.; Coupling, 20c. per ft.
Punches.
Belt or Drive per doz $1·50 net
Spring per doz $7·00—dis 20&10 %
Rail.
Sliding Door, Wrought Brass ⅌ ℔ 44c., dis 10 %
" " Iron, Painted ⅌ foot 9c—dis 55&10 %
Barn Door, ⅛, ⅜ and ¾ inch dis 60&10&10 %
" " for N. E. Hangers dis 60&10&10 %
Rakes.
Cast Steel dis 35 %
$8 00 9 00 10 00 11 00
8 10 12 14 teeth.
Malleable dis 35 %
$5 00 5 50 6 00 6 50
9 11 13 15 teeth.
Razor Straps.
Evan's dis 25&10 %
Genuine Emerson (B. F. Badger or C. Emerson) dis 25 %
Imitation Emerson ⅌ doz $2·75—dis 40 %
Hunt's dis 40 %
Chapman dis 10 @ 15 %
Torrey's dis 10&10 %
Saunder's net @ 10 %
Rivets.—Old Colony.
Iron and Tinned dis 25&7½ %
In bulk dis 7½ %
Copper Rivets and Burrs dis 20 %
Nos. 7 8 9 10 11 12 13 14 15
Per lb. 49c 50c 52c 54c 56c 58c 60c 65c 70c
Rivet Sets net
Rods.
Stair dis 40 %
" American Patent dis 33⅓ %
Rollers.
Barn Door revised list dis 60, 10&10 %
Novelty dis 10 %
Rope. Manufacturers' List of May 10, 1875.
Manila ½ inch and larger ⅌ ℔ 15 c
" ⅜ inch ⅌ ℔ 15½c
" ¼ and 5-16 inch ⅌ ℔ 16 c
Manila Lath Yarn and Tar'd Rope ⅌ ℔ 14½c
" Hay Rope ⅌ ℔ 15½c
Sisal ½ inch and larger ⅌ ℔ 12 c
" ⅜ inch ⅌ ℔ 12½c
Sisal ¼ and 5-16 inch ⅌ ℔ 13 c
" Hay Rope ⅌ ℔ 12½c

Rules.

	Boxwood.	Ivory.
Chapin's	dis 66⅔&10 %	dis 50&10 %
Stanley	dis 70 %	dis 55 %
Standard	dis 70 %	dis 50&10 %
Stephens'	dis 70&10 %	dis 55&10 %

Sad Irons.
From 4 to 10 lbs. ⅌ ℔ 3¾ @ 4c net
Sad Iron, Nickel Stand attached ⅌ ℔ 9c
Self-Heating per doz $10 00 net
" " Tailors' per doz 22 50 net
Sand Paper.
Beader & Adamson's Flint, 00 to 1½ $4 25 ⅌ ream; " " " 2, 2½ & 3, 4 75 "; " " " Assorted. 4 25 "; " " Star ⅌ ream $3 25; " " Emery ⅌ ream $6 50 @ 11 50 } dis 15 %
New England, same list as B. & A. Flint dis 15 %
H. B. & M. Roman Flint " " " dis 15 %
Sash Cord.
Common ⅌ ℔ 18 @ 20c. net
Patent ⅌ ℔ 24c. net
Silver Lake, Russia Flax ⅌ ℔ 55c; " " White Cotton ⅌ ℔ 55c; " " Drab Cotton ⅌ ℔ 60c } net
Raw Hide dis 15 %
Sash Locks.
Clark's, Nos. 1 and 2, $10·00 per gross dis 33⅓ %
Ferguson's dis 33⅓ %
Norwich dis 25 %
Walker's dis 10 %
New England dis 20 %
Sash Weights.—Solid Eyes ⅌ ℔ 2c
Sausage Stuffers or Fillers.
Miles ⅌ doz $20—dis 30 %
Stow or Perry ⅌ doz No. 1, $15; No. 0, $21—dis 20 %
Draw Cut No. 4 each $30 00—dis 20 %
Saw Frames per gross $18 00—dis 15&10 %
Saw Rods $10 list, dis 10&10 %
Saws.
Spear & Jackson's old pattern $4 50 to £ gold
Spear & Jackson's American Pattern $3·35 to £ gold
John Spear $3 60 to £ gold
Am. Saw Co. new list
Perforated Cross Cuts, all kinds 68c ⅌ foot
Inserted Tooth dis 10 %
All else dis 12½ %
Disston's Circular dis 20 %
" Mill dis 25 %
" Cross Cut dis 15 %
" other kinds dis 12½ %
H. W. Peace's Circulars dis 25 %
" Other kinds dis 20 %
Wm. McNiece's Hand, Cross Cut and Circular new list dis 15 %
Wm. McNeice's Patent Pole Pruning Saw dis 10 %
" " Compass Saw net.
E. M. Boynton's Lightning dis 40 %
" " Others dis 15 %
Wheeler & Clemson Mfg. Co.'s Hand dis 15 %
" " " " Cross-Cut dis 30 %
Livingston's Butcher and Kitchen dis 15 %
" Framed Wood— Nos. 101 102 103 105 106; Per doz $12·00 10·00 12·00 8·00 7·00—net
Saw Sets.
Stillman's Genuine ⅌ doz $5·00—dis 10 %
" Imitation ⅌ doz 3·25—dis 20 %
Aiken's Pattern ⅌ doz 7·00—dis 25&10 %
" Genuine ⅌ doz $15·00—dis 25&10 %
Hart's Patent dis 15 %
Nash's dis 20&10 %
Bemis & Call's dis 20 %
Hotchkiss' ⅌ doz 5·50—dis 10 %
Common Lever per doz $2 00—dis 20 %
Leach's dis 15 %
Scales.
Hatch, Counter ⅌ doz $36—dis 25 @ 30 %
" Tea ⅌ doz $15—dis 25 %
Union Platform $6·00, $7·50—dis 40 %
Turnbull's dis 20 %
Brown's dis 25&5 %
Fairbanks' new list dis 15 @ 20 %
Howe's dis 15&5 %
Chatillon's Grocers' dis 25 %
" Eureka dis 20 %
Universal Family dis 25 %
Scale Beams.
No. 1 300 to 1200 lbs. 90c ⅌ cwt; No. 2 " 75c ⅌ cwt } dis. 30&10 %
Scrapers.
Box, 1 Handle per doz $5·00, dis 10 %
" 2 " per doz 6·00, dis 10 %
Foot dis 60 & 10 %
Ship (common) per doz $3 00 net
Ship—Providence Tool Co. dis 10 %
Screw Drivers.
Hart, Bliven & Mead dis 55&10 %
Douglass Mfg. Co. dis 25&10 %
" " No. 1 dis 20&10 %
Disston's dis 40&10 %
Screws.
Flat Head Iron, List of September 1, 1875 dis 30 %
Round Head Iron " " " dis 20 %
Flat Head Brass " " " dis 30 %
Round Head Brass " " " dis 20 %
Round Head Silver Capped, List March 1 dis 25 %
Hand Rail dis 55&10 %
Coach or Lag dis 30&10 @ 40 %
Coach, Patent Gimlet Point, List Jan. 1, 1875 dis 35 %
Bed list net
Japanned dis 50&10 %
Machine—Flat Head, Iron, List Jan. 12, 1875 dis 25 %
" " " Brass, " " dis 15 %
Round Head, Iron, " " dis 20 %
" " Brass " " dis 10 %
English, Flat Head, Iron; American List, Sept. 1, 1875
Nettlefold & Chamberlain's dis 30&5 %
Birmingham Sc'w Co dis 30&5 %
Birmingham Screw Co., Brass dis 30&10 %
Bench—Iron dis 60, 10&10 %
" —Wood, Beach ⅌ doz $3·00 net
" " Hickory dis 20&10 %
Hand dis 25&10 %
Jack—Bell Bottom dis 15 %
Scythes.
Blood's German Steel, Grass ⅌ doz $10 00; " Cast " " ⅌ doz 11 00; " Silver " " ⅌ doz 12 00; " German " Grain ⅌ doz 14 00; " Cast " " ⅌ doz 15 00; " Excelsior and Granger ⅌ doz 11 00; " Young America 10 50; " Silver Clipper 13 00 } dis $1·50 from list
Scythe Snaths dis 20 %
Sieves.—Mann's Patent New list net
14 16 18 20 24 30 mesh
Iron $3·00 3·00 3·25 3·50 3·75 4·75 ⅌ doz
Plated 3·50 3·75 4·00 4·25 4·50 6·00 "
Wood Rims 18 mesh, $1·50 per doz, dis 10 %
Shears and Scissors.
Cast Steel dis 75 @ 75&10 %
Cast Iron New list July 15 dis 30 %
Heinisch Sons' Trimmers and Scissors dis 65 %
" " Standard quality Shears and Trimmers dis 40 %
Seymour's Straight Trimmers dis 60&10 %
" Scissors dis 50 %
Pruning per doz $10 00—dis 35 %
Barnard's Lamp Trimmers per doz $8·75
Sheaves.
Sliding Door, M. W. & Co. list dis 40&5&2 %
" R. & E. list dis 50&5&2 %
" Patent Roller dis 25 %
" " " Hatfield's dis 50 %
" Russell's Anti-Friction dis 50 %
Sliding Shutter, R. & E. List dis 50&5&2 %
Shovels and Spades.
Ames dis 20 %
Birmingham Shovel Co. dis 15 %
Rowland's dis 25 %
Old Colony new list dis 10&5 %
Middleboro' Shovel Co. new list dis 20 %
C. E. Jennings New list dis 30&10 %
Dunning's Shovels and Scoops dis 20&7½ %
Shovels and Tongs.
Iron and Brass Head, R. & E. list dis 50&10&2 %
" " Hart's dis 55&2&10 %
Polished Steel dis 50&10 %

Skates.
Barney & Berry's
N. Y. Club.....₩ pair $2·75 } dis 25 %
B. & B. Club..... " 3·50
All Clamp..... " 4·25
Rink..... " 8·00
Florence Steel.....$1·00 dis 25 %
" Spring.....3·00 dis 30 %
" All Clamp.....3·50 dis 30 %
Peck & Snyder's—
No. 1, Blued.....per pair $3·00 } dis...25 %
No. 2, Nickel Plated.....per pair 6·00
No. 3, " " extra..per pair 8·00
Clipper Club Blued.....per pair 3·50
" " Full Pol'd....per pair 4·50
" " " and Nickel
Plated.....per pair 6·00

Slates.
Square Frames, Round Cornered, by case.....dis 65&10 %
Less than a case.....dis 65 %

Spoke Shaves.
Iron.....dis 33⅓&10 %
Wood.....dis 30 %
Bailey's.....dis 20&10 %

Spoons.
Tinned Iron.....dis 10 %
By the case.....dis 20 %
Basting.....dis 10 %
Britannia.....dis 50&5 @ 55 %
" Boardman's, new list.....dis 55 %
Rogers & Bro., A 1.....dis 50 %
Derby Silver Co.....dis 50 & 5 %
Holmes, Booth & Haydens.....dis 50 %
Nickel Silver Co.....dis 40 %
German Silver.....dis 30 @ 33⅓ %
Tin (P. S. & W.)—
Teas.....$1·50 ₩ gross, net
Tables.....2·75 " net

Stocks and Dies.....dis 5&10 %

Stone.
Hindostan Stone.....₩ ℔ 6c } dis 20&10 %
" Axe Stone.....₩ ℔ 8c
" Slips.....₩ ℔ 10c
Sand Stone.....₩ ℔ 6c—dis 20&10 %
Washita Stone.....No. 1, ₩ ℔ 25 @ 30c net
" .....No. 2, ₩ ℔ 20 @ 25c net
" Slips.....No. 1, ₩ ℔ 50 @ 55c net
Arkansas Stone.....No. 1, ₩ ℔ $1·25 net
" Slips.....No. 1, ₩ ℔ $2·00 net
Grindstones, Family, J. F. Green & Bro.....dis 20 %

Stove Polish.
Joseph Dixon's.....₩ gross, 6 00
Gem.....₩ gross $4 50
Gold Medal.....₩ gross $6 00 dis 25 %

Squares.
Steel.....dis 50 %; full cases, dis 50&10 %
Iron.....dis 50 %; full cases, dis 50&10 %
Nickel Plated.....add $2 50 @ $4 00 ₩ doz net
Try Squares and T Bevels.....dis 45&10 %
Star Try Squares and Bevels.....dis 30 %
Disston's Try Squares No. 1.....dis 20 %
" " No. 2.....dis 40 %
" " Improved.....dis 20 %

Tacks.
Full Weight American Iron.....dis 45&7½ %
Half Weight American Iron.....dis 72½&7½ %
Carpet.....dis 7½ %
Brads American Half Weight.....dis 50&7½ %
Finishing Nails..... ⅜ ⅝ ¾ 1 1¼ in. and over
₩ ℔..... 25c 20c 18c 14c 12c dis 7½ %
Trunk and Clout..... ⅜ ⅝ ¾ 1 1¼ in. and over
₩ ℔..... 25c 20c 18c 14c 12c dis 7½ %
Copper Tacks.....₩ ℔ 50c—dis 7½ %
Iron Shoe Nails, ₩ ℔ 4-8 and longer, 9½c; 3½-8, 10c.....dis 7½ %
Double Pointed.....dis 33⅓&10 %

Tapes, Measuring.
American Flask and Cap Co.....dis 20 %
Eddy's.....dis 20 %

Tea Trays.
American Tea Tray Co.....dis 15 %

Thermometers.
Tin Case.....dis 50&10 %

Toe Calks.
Winsted.....₩ ℔ 13c., dis 10&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20 %
Wood Bottom.....per doz $12—dis 25&10 %
All Iron.....per doz $10·50—dis 25&10 %

Tinners' Tools and Machines.
P. S. & W.....list net

Traps.
Game, Newhouse.....dis 25 %
" Peck, Stow & Wilcox.....dis 30 %
" Hotchkiss.....old list dis 30 %; new list dis 10 %
" Blake's Patent.....dis 30 %
Mouse, Wood Choker.....₩ doz holes, 15 @ 16c
" Patent Choker (Union Nut Co.).....₩ doz holes 16 @ 18c net
" Round, Wire.....₩ doz $1 50 to 2 00 net
" Square, ".....₩ doz 2 00 to 2 50 net
" Cage, ".....₩ doz 2 50, dis 10 %

Trowels.
Lothrop's Brick and Plastering.....dis 10 %
Disston's Brick and Plastering.....dis 12½ %
Rose's Brick.....dis 5 %
Brades' Brick.....gold, dis 10 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 25 %

Triers.
Butter and Cheese.....dis 25 %

Ventilators (Window).
Nickel and Gilt.....per dozen $16·00 @ 18 00

Vises.
Trenton Vises, Solid Box.
40 to 160 lbs.....16c
160 and over.....18c
Peter Wright's.....₩ ℔ 15½c. gold
Wilson's Solid Box.....dis 15 @ 20 %
31 to 160 lbs.....18c
160 and upward.....22c
Wilson's Parallel.....dis 30 %
Sargent's.....dis 50&10&10 %
Backus & Union, Parallel.....dis 25 %
Buffalo, Parallel.....new list dis 25 %
Fisher & Norris' Double Screw Parallel.....dis 15&10 %
Trenton Parallel.....dis 15 %
Merrill's Parallel.....dis 15 %
Parker's.....dis 20 %
Stephens' Parallel.....dis 15 @ 20 %
Bonney's Saw Filers.....per doz $20—dis 20 %
Stearn's Saw Filers.....per doz $20—dis 20 %

Wheel Barrows.
Canal (Pugsley & Chapman).....new list dis 15 %
Coal, Garden and Stone (Pugsley & Chapman).....dis 25 %

Well Wheels.
Revised list.....dis 60&10 %

Wire.
Brass and Copper.....dis 10 %
Bright and Annealed.....Nos. 0 @ 18 dis 40 @ 45 %
" " .....19 @ 26 dis 47½ @ 52½ %
" " .....27 @ 36 dis 52½ @ 57½ %
Coppered.....0 @ 18 dis 35 @ 40 %
Galvanized, Nos. 0 to 9.....₩ ℔ 8½ @ 9c net
Galvanized, Nos. 10 to 18.....market list dis 10 @ 15 %
Tinned.....dis 25 @ 30 %
Cast Steel.....dis 15 @ 20 %
Tinned Broom Wire.....dis 30 @ 35 %
Galvanized Telegraph, Nos. 8 and 9.....₩ ℔ 9c @ 9½c
Galvanized Telegraph, Nos. 10 and 11.....₩ ℔ 10c @ 10½c
" " " 12.....₩ ℔ 10½c @ 11c
Annealed Fence, Nos. 8 and 9.....dis 40 @ 45 %
" Grape, " 10 to 14.....dis 40 @ 45 %
Fence Staples.....₩ ℔ 8 @ 8½ %
Stubs' Steel Wire.....$7 00 to $ gold
Judd's Picture Wire.....dis 50
Clothes Line Wire.....per coil 60c. net

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "S".....dis 20 %
" Diagonal.....dis 20 %
Collins & Co.'s.....dis 45 %
Coes' Genuine.....dis 40&5 %
" Pattern (Wrought).....dis 50&10 %
" " (Malleable).....dis 65&10 %
Lindsay's Patent.....dis 25 %
Taft's Pattern.....dis 70&10 %
Davis Patent Duplex.....new list dis 25 %
Bemis & Call's Patent Combination.....dis 20&5 %
" " Merrick's Pattern.....dis 25&2½ %
" " Brigg's Patent.....dis 15&10 %
Aiken's Pocket (Bright).....per doz $10·00—dis 50&10 %

Wringers.

	Less than 2 doz	2 doz lots
Providence	₩ doz $77·00	$70·00
Reliance	₩ doz 69·00	67·00
Universal—Extra	₩ doz 72·00	70·00
Novelty	₩ doz 73·00	70·00
Sherman	₩ doz 72·00	70·00
Wringers without Cog Wheel	₩ doz 58·00	60·00

TIN WARE AND TRIMMINGS.

STAMPED TIN WARE, dis 10 %.

COMMON STAMPED WARE, &C.

Bucket Covers.

Quarts	½	1	2	3	4
Inch	4⅝	5 8-16	6 5-16	6⅞	7 11-16
Per gross	$2·00	2·60	3·40	4·25	5·75
Quarts	6	8	10	12	
Inch	8⅝	9⅝	9⅞	10 9-16	
Per gross	$6·50	8·00	8·50	11·50	

Cake Box Covers.

	Small.	Medium.	Large.
Inch	11⅛	12⅛	13⅛
Per gross	$15·00	18·00	22·00

Pot Covers.

Inch	7⅞	8⅜	8⅞	9⅜	9⅞	10⅜
Per gross	$5·75	6·00	6·25	6·75	7·25	8·25
Inch	10⅞	11⅜	11⅞	12⅜	12⅞	13⅜
Per gross	$8·75	9·50	10·00	13·00	13·75	16·50

Pie, Dinner or Scolloped Plates.

Inch	6	7	8	9	10	11
Per gross	$4·00	4·50	5·50	5·50	8·50	10·50

Deep Pie Plates.

Inch	9	10
Per gross	$8·50	10·50

Jelly Cake Pans.

Inch	9	10
Per gross	$7·50	10·00

Coffee Pot Covers.

Plain	1½	2	3	4	5	6 qts.
Inch	3	3⅜	3⅞	4½	5	
Per gross	$1·15	1·40	1·60	2·00	2·75	3·00
Rimmed	2⅞	3	3½	4	4½ inches.	
Per gross	$2·25	2·50	3·00	3·50	4·00	

T. K. Breasts only.

Inch	7½	8	8½	9	9½	10	10½	1½
Per gro.	$6·00	6·50	6·75	7·25	7·75	9·50	10·00	12·00	13·00

Grater Plates.

Sheet	¼	½	1
Per gross	$3·00	6·00	11·50

Scolloped Cake Pans.

	Small.	Large.
Without Tubes.....per gross	$9·00	11·50
With Tubes..... "	10·50	14·00

Stamped Square Pans.

No	½	
Per gross	$7·50	14·50

Common Square Pans (One Sheet).
Per gross.....$11·50

Milk Skimmers (Plain or Pierced).
Per gross.....$4·00

Lettered Plates

Inch	5½	6
Per gross	$3·25	4·00

Steamer Bottoms.
Add $1 per gross, or 10c. per doz. to list of Pot Covers.

Tin Stove Pipe Rings.

Inch	4	4½	5	5½	6	7
Plain.....per gro.	$4·00	4·50	5·00	5·50	6·00	7·00
Jap'd or Burn'd.. "	6·00	6·50	7·00	8·00	9·50	10·00

Coffee Boiler Lips.

	Small.	Large.
To Rivet.....per gross,	$0·80	1·10
To Solder..... "	1·25	

STAMPED DEEP AND RETINNNED WARE.

Discount 20&10 %.

Plain Stamped Water Dippers.

	½ pint.	Pint.	Quart.	quarts.	2½ quarts.
Per doz	·90	1·15	1·50	1·85	2·50

Retinned Milk Pans.

Qts...	½	1	1½	2	3	4	5	6	8	10	12
₩ doz,	1·20	1·50	1·75	2·00	2·25	3·15	3·50	3·85	4·75	5·25	5·75

Dipper Bowls, Plain Stamped—
Pints.....½ 1 Quarts.... 1 2 2½
Per doz. ·50 ·75 Per doz... 1·00 1·25 1·75
Dipper Bowls Retinned—
Pints.....½ 1 Quarts.... 1 2 2½
Per doz. ·75 ·95 1·05 Per doz .. 1·40 1·75 2·25

Pans.
Dish Pans, Retinned Deep—

Quarts	7	8	10	14	17	21	30
Per doz.	8·50	9·50	11·00	13·00	16·00	19·00	30·00

JAPANNED TIN WARE, dis 5 %.

Cannisters, Common.....Pound ½ 1 2 3
Per gross $10·50 15·00 24·00 30·00
Canisters, Hinged.....Pound 1 1½ 2 3 4
Per gross $19·00 25·00 32·00 37·00 42·00
Canisters, Square.....Pound 2 4 6 8 12 16
Per doz $3·00 4·25 5·00 5·75 8·00 9·00
Candlesticks, Japanned.....No. 1 2
Per gross $8·00 7·00
Cake Boxes, Round.....per nest, $3·25
Square.....per nest, 4·25
Chamber Pails, Japanned

Nos	2	3	4	5
Green, per doz.	$8·00	9·00	11·00	13·00
Oak "	$9·00	11·00	12·00	13·50

Dust Pans, Corrugated.....per gross, $22·00
Box Graters.....per gross, $3·75
Molasses Cups..... Pint ½ 1 3 4
Per gross $13·00 16·00 28·00 42·00
Lunch Boxes, per doz.....7 in $2·00; 8 in. $2 50
Pepper Boxes Japanned..₩ gross small, $3·00; large, $4·00
Toy Banks, House.....No. 1 2
Per gross $7·00 5·50
Toy Banks, Gothic.....No. 1, $6·00, No. 2, 4·00 per gross
Toy Cups, Straight.....No. 1 2 3
Per gross $3·75 3·25 2·75
Toy Cups, Flaring.....No. 1, $4·25; 2, $3·75 ₩ gross
Toy Pails, Covered.....No. 1, per gross $4·00
Toy Rattles.....per gross, $2·00
Trunks, Wire Handled.....per nest (5) $1·75
Spittoons, Tin.....per gross, $27

PLANISHED TIN WARE, dis 20 %

Tea Pot Handles—P. S. & W.....dis 20 %
Stow's Patent Hollow Tea Pot Handles.
No. 1, Small 4½ inches.....per gross, $11·50
No. 2, Medium, 5⅜ " ..... " 12·50
No. 3, Large, 6⅜ " ..... " 13·50
No. 4, Ex. Large 7¼ in., for Wash Pitchers &c..... " 18·00
Solid Iron, Tin Tipped.
No. 10, Small, 4⅜ inches.....per gross, $9·00
No. 15, Medium, 6⅜ " ..... " 9·50
No. 20, Large, 6⅜ " ..... " 10·75
Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.
No. 12, Bronzed and Tin-Tipped.....per gross, $13·50
Saucepan Handles, Of Best Malleable Iron.
P. S. & W.....dis 20 %

Japanned.
No. 1, 5¼ inches long.....per gross, $3·50
No. 2, 6 " ..... " 3·75
No. 3, 6½ " ..... " 4·00
No. 4, 7¾ " ..... " 4·25
No. 5, 8 " ..... " 4·50
No. 6, 9 " ..... " 4·75

Tinned.
No. 1, 5¼ inches long.....per gross, $4·25
No. 2, 6 " ..... " 4·50
No. 3, 6½ " ..... " 4·75
No. 4, 7¾ " ..... " 5·25
No. 5, 8 " ..... " 5·50
No. 6, 9 " ..... " 5·75
Japanned.....per lb., ·16
Tinned..... " ·20

Iron Kettle Ears (P., S. & W.).....dis 45 %
Half gross pairs in a package.

Tinned

Nos	1	2	3	4	5	6	7
Per gross pairs	88c	$1·00	1·50	1·75	2·10	2·75	3·75

Black.

Nos	1	2	3	4	5	6	7	8
Per gross pairs	75c	88c	$1·35	1·50	1·75	2·25	2·75	4·00

Tinned Tea Kettle Ears.

Nos	4	5	6
Per gross pairs	$1·75	2·10	2·75

Extra Heavy Tinned Kettle Ears—French Pattern.

Nos	1	2	3	4	5	6	7
Per gross pairs	$1·00	1·25	1·50	1·75	2·00	2·50	3·00

Malleable Iron Kettle Ears for Coal Hods, &c.
P., S. & W.....dis 20 %
No. 10 Small.....₩ ℔, Tinned 20c; Black, 16c
No. 20 Medium.....₩ ℔, " 20c; " 16c
No. 30 Large.....₩ ℔, " 20c; " 16c
No. 40 Extra Large.....₩ ℔, " 20c; " 16c
In cases of 100 lbs. each.
Milk Can or Boiler Handles—(P. S. & W.) 4½ in..dis 25 %
Plain, 8c.; Japn'd, 9c.; Tinned, 15c. per lb.; Malleable Clips or Ears to match, Tinned.....30c per lb.
Toilet Ware Handles—4½ inches (P. S. & W.).....dis 35 %
Plain with drilled holes, per lb.....9c
Plain with Cast " " 8c
Plumbers' Scrapers—(P. S. & W).....dis 25 %
Extra quality, length 6 in., per doz.....$4·00

METALS.

IRON.—Duty Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1½ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1¼ cents per lb.

Pig Iron—American.
Foundry No. 1.....₩ ton, $25 00 @
Foundry No. 2..... " 23 00 @
Gray Forge..... " 20 00 @ 22 00
SCOTCH.
Coltness..... " 32 00 @ 33 00
Glengarnock..... "
Gartsherrie..... "
Eglinton..... " 32 00 @ 32 50

Bar Iron.
Am. Refined, at mill.....2·6c. @ 2·8c

Rails.
American, at works, currency..... " 45 00 @ 50 00
Old Rails.....

Scrap.
Wrought Scrap..... " 32 00 @ 34 00

Bar Iron from Store.
Common Iron.
¾ to 2 in. round and square.... } ₩ ton $57 50
1 to 6 in. x ⅜ to 1 in..... }
Refined Iron.
¾ to 2 in. round and square.... } " 60 00
1 to 6 in. x ⅜ to 1 in..... }
1 to 6 in. x ¼ and 5-16..... " 65 00
Shafting Iron—2½ to 4 in..... " 67 50 @ 77 50
Rods—5-16 to ⅝ round and square.. " 62 50
Bands..... " 75 00
Hoops—⅝ to 2 in..... " 82 50 @ 132 50
Swedish Iron.
Ordinary sizes..... " 132 50 @ 135 00
Plow size..... "

Sheet Iron.

	Common American and English.	R. G. American.	R. G. English
10 to 20.....₩ ℔	4c	5c	5½c
21 to 24..... "	4½c	5¼c	5¾c
25 to 26..... "	4½c	5¼c	5¾c
27.....	4¾c	5¾c	6c
28..... "	5c	5c	6¼c

Galvanized, 14 to 20, prime, ₩ ℔ 8½c; 2d quality ₩ ℔ 7½c
" 21 to 24 " " 9¼c " " 8¼c
" 25 to 26 " " 10 c " " 9 c
" 27 " " 10½c " " 9½c
" 28 " " 11½c " " 10½c
Patent Polished.....₩ ℔ 14c
Russia, Nos. 8 to 16..... " 15½c
" Stained, No. 1..... " 14½c
Belgian.....10c
One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON.

⅓	5	5½	6	7 inch.
$2·50	3·50	4·50	5·25	6·50 per doz.

RUSSIA IRON.

4½	5	5½	6	7 inch.
$5·00	7·00	9·50	12·00	14·00 per doz.

COPPER—Duty. Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ ℔; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem.
American Ingot.....₩ ℔ 23¼ @ 23½c
English " .....

SHEATHING, BRAZIERS COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot.....31c. ₩ ℔
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot.....33c. "
Braziers' Copper, 12 oz. per square foot.....35c. "
Circles less than 84 inch in diameter.....34c ₩ ℔
Circles, 84 inch diameter and over.....37c. "
Segment and Pattern Sheets.....34c. "
Locomotive Fire Box Sheets.....31c. ₩ ℔
Sheathing Copper, over 12 oz. per sq. ft.....30c. "
" " 12 oz. ₩ sq. ft. and lighter.....35c. "
Bolt Copper.....31c. "
Copper Bottoms, 33c. ₩ ℔.....net
No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

O'NEILL'S PATENT PLANISHED COPPER.

14x48.
14 and 16 oz. and heavier.....37c. By the case, 36c. ₩ ℔
12 oz. and lighter.....40c. " " 39c. "
Boiler Sizes.
7 in., 14x52. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier.....39c. By the case, 38c ₩ ℔
(And all sizes not over 30 inches wide.)
30x60
14 and 16 oz. and heavier.....41c. ₩ ℔
12 oz.....44c. "

TINNING.

14x48, by the case.....8c. ₩ sheet
14x48, less than case.....10c. "
Other sizes not larger than 30x60.....2½c. ₩ sq.
Larger than 30x60.....5c. "

Brass.

ROLLED AND IN SHEETS.

For the purchase of 100 pounds and over at one time

HIGH BRASS.

All Nos. to No. 8, and widths 14 in. and under.....30c
All Nos. to No. 8, inclusive, and widths over 14 to 0 in. inclusive.....33c
Over 0 in. to 30 in. inclusive.....36c
½c ₩ ℔ advance on each No. above No. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass at.....49c
Sheets 4x48 in., and all sheets cut to particular sizes and lengths.....36c
Printers' Rules.....40c
Sheets wider than 30 in. and under 40 in.....40c
" 40 in. and over.....42c
Circular sheets in diam. from 4 in. to 14 inclusive.....40c
" " " over 14 in. to 0 " 43c
" " " " 0 in. to 30 " 46c
" " " " 30 in. to 40 " 49c
" " " " 40 in.....52c

LOW BRASS.

4c ₩ ℔ more than High Brass.
Gilding Metals, 7c ₩ ℔ more than High Brass.
Platers' or Gold Metal } In Bars.....42c
} Sawed.....45c
FOR SLITTING: Metal in Width.
In. to ½ in., to No. 30, inclusive, 1c ₩ ℔ advance.
In. to 1 in., thinner than No. 30, c ₩ ℔ advance.
In. to ½ in., " " 30, 3c " "
½ in. and less to No. 30, c ₩ ℔ advance.
½ in. and less thinner than No. 30, 5c ₩ ℔ advance.

BRASS AND COPPER WIRE

(Stub's Wire Gauge).

	High Brass.	Low Brass.	Gild'g and Cop'r
Nos. 0 to 20	33	37	43
Nos. 21, 22, 23	34	38	44
Nos. 24 and 25	35	39	45

Brass Rods, No. 8 and larger, 39c ₩ ℔, less 10 per cent.
Wire straightened and cut, smaller than No. 8, special rates, not less than 6c ₩ ℔ advance.

FINE WIRE—NET PRICES.

	High Brass.	Low Brass.	Gild'g and Cop'r
No. 6	0·41	0·45	0·51
No. 7	0·44	0·48	0·54
No. 8	0·46	0·50	0·56
No. 9	0·48	0·52	0·58
No. 30	0·50	0·54	0·62
No. 31	0·52	0·56	0·66
No. 32	0·56	0·60	0·71
No. 33	0·60	0·64	0·81
No. 34	0·64	0·68	0·91
No. 35	0·69	0·73	1·08
No. 36	0·78	0·82	1·15
No. 37	0·93	0·98	1·28
No. 38	1·25	1·29	1·78

Ten cents per pound extra for Spooling.

MISCELLANEOUS.

Common Plain Brass Pail Ears.....39c net
Hose Pipes, 500 and over.....79c net
" under 500.....84c net
Door Rail.....44c—dis 10 %

TUBING
(Brown & Sharpe's Gauge.)

Plain to No. 20, inclusive.....₩ ℔ $0·43
Nos. 21, 22, 23, 2c. advance on List for each No.
Nos. 24, 25, 26, 4c. " " "
Above No. 26 special rates.
Plain Tube, 1-4 inch.....84
" 3-16 " 1 49
" 1-8 " 1 74
All Mandrel-Drawn Tubes 5c. advance on List.
Fancy Tubing 4c. advance on List above Plain.
English, Scotch, and Extra Patterns Fancy Tubing to No. 20.....57
Tubing sawed or cut 2 to 4 ft. long, 2c. advance on List.
Add to two cents a half-cent for each additional cutting under two feet.
Discount on the foregoing list, 10 per cent.

LEAD—Duty: Pig $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb.
Spanish.....7c gold
German Refined.....6¾c gold
English.....6¾ @ 7c gold
American.....6 @ 6½c gold
Bar.....dis 10 %.....8½c.
Pipe.....dis 10 %.....9½c.
Tin Lined Pipe.....dis 10 %.....16½c.
Sheet.....dis 10 %.....9½c.
Shot.....dis 10 %. Drop, 9½c. Buck, 10½c.

BABBITT METAL.

N. P. U.....₩ ℔ 8½ @ 9c
A., 25c.; B, 20c.; C, 15c.; D, 13c. ₩ ℔.

SOLDER.....No. 1, 14c.; No. 2, 18c

STEEL—Duty: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb. over 11, 3½ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.
Tool.....15 @ 16c
Spring.....10c
Homogeneous.....12½c
Tire.....12½ @ 13½c
Machinery (round and square).....10 @ 11c
File.....11c
Sheet.....14 @ 16c
Saw Plate, mill and mulay.....14 @ 16½c
Saw Plate, gang and X cut.....13 @ 14c
" circular as to size.....18 @ 30c

Chrome Steel.
Tool.....₩ ℔ 20 @ 21c
Tool, extra fine..... " 40 @ 75c
Spring.....₩ ℔ 12c and upward
Machinery.....₩ ℔ 14c
Hammer..... " 15c,
Gun or Homogeneous..... " 16c

English Steel, payable in gold, net.
" Best Cast.....₩ ℔ 17½c
" Extra Cast..... " 1½c
" Round Machinery, Cast.....₩ ℔ 10½ @ 11½c
" Swaged, Cast..... " 19½c
" Best Double Shear..... " 17½c
" Blister, 1st quality..... " 14½c
" " 2d quality..... " 13 c
German Steel, Best..... " 11½c
do 2d quality..... " 10½c
3d quality..... " 9½c
Sheet Cast Steel, 1st quality..... " 17½c
" " 2d quality..... " 14½c
" " 3d quality..... " 12½c
File Steel, Flat and ½ Round..... " 12½c
" Square and Round..... " 12½c
" Mill..... 13½c
Taper to 4 inch..... " 16c
Taper 3 and 3½ inch..... " 18c

SPELTER—Duty: In Pigs, Bars and Plates, $1 50 per 100 lbs.
Silesian, cash.....6¾ @ 7c., gold
American ".....7¼ @ 11c., currency

TIN—Duty: Plates, Sheets, Tagger and Terne, 1·1c per lb.; Electro-galvanized Plates, 2 cents per ℔; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.
Banca.....₩ ℔ 23½c., gold
Straits.....₩ ℔ 19 @ 20c, gold
English.....₩ ℔ 19 @ 20c., gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal.....9 @ 9·50
12x12, " .....9·50 @ 10·00
14x20, " .....9·75 @ 10·25
I X 10x14, " .....11·25 @ 11·75
12x12, " .....11·75 @ 12·25
14x20, " .....12·25 @ 12·75
D C 12½x17 " .....8·50 @ 9·00
D X 12½x17 " .....10·75 @ 11·25
For each additional X add.....2·25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14	$ 8·75 @ 9·00	8·25 @ 8·50	7·50 @ 8·25
I C 12x12	9·25 @ 9·50	8·50 @ 8·75	
I C 14x20	9·25 @ 9·50	8·50 @ 8·75	7·50 @ 8·00

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$ 8·25 @ 8·50	8·00 @ 8·25	7·50 @ 8·00
I X 14x20	10·75		
I C 20x28	17·75 @ 18·00	16·25 @ 17·00	16·25
I X 20x28	23·00		
I C 20x20	22.50		

ZINC.—Duty: Pig or Block, $1 50 per 100 lbs. Sheet 2½c. ₩ ℔.
Sheet.....cask 10½c
".....open 10½c

Old Metals.

(Dealers' Selling Price.)

Copper.....@ 20
Yellow metal.....14 @ 15
Brass.....13 @ 14
Heavy Composition.....17 @ 18
Old lead, solid.....6 @ 6¼
Tea lead.....5
Wrought iron.....1⅛ @
Sheet iron.....0⅞ @ 0⅝
Cast iron.....⅝
Machinery iron.....1⅛ @ 1
Zinc.....5 @ 5⅛
Pewter, No. 1.....17
" No. 2.....10 @ 12
Spelter.....5 @

Paints, Oils, etc.

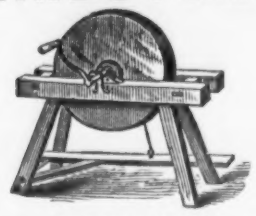
Paints.
Black, lamp—Coach Painters.....₩ ℔ 20c
" " Ordinary.....6c
" Ivory Drop, fair.....15c
" " best.....26c
Black Paint, in oil.....kegs, 8c.; asst'd cans, 11 c
Blue, Prussian, fair to best.....50 @ 75c
" " " " in oil.....35 @ 65c
" Chinese, dry.....83c
" Ultamarine.....25 @ 80c
Brown, Spanish.....1½c
" Van Dyke.....9c
Carmine, 40.....$12 00
Green, Chrome.....15 @ 23c
" " in oil.....18 @ 25c
" Paris.....good, 30c; best, 40c
" " in oil..... " 30c " 45c
Mineral Paints.....1¼ @ 4c
Orange Mineral.....14c
Red Lead, American.....9½c
" " English.....10½c
" Venetian (N. C.) dry.....2½c
" " in oil.....asst'd cans, 11c; kegs, 8½c
" Indian, dry.....10c
Rose Pink.....12c
Sienna, American, Raw.....4c
" Burnt.....4½c
" " in oil.....16 @ 20c
" Raw " .....15 @ 25c
Umber, Burnt.....4 @ 8c
" " in oil.....16 @ 21c
" Raw.....3½ @ 7½c
" " in oil.....16 @ 22c
Vermillion, Chinese.....
" English.....1 15, gold
" Trieste.....1 10 "
" American, Common.....28c
White Lead, American, pure dry.....10c
" " in oil.....11c
White, Paris, English, prime.....in bbls. 2½ @ 2¾c
Yellow Ochre, French.....2½ @ 2½c
" " " in oil....asst'd cans, 11c; kegs, 8½c
" " Vermont.....in casks 1½c
Yellow Chrome.....17 @ 27c
" " in oil.....18 @ 28c
Zinc White, American No. 1 dry.....9c
" " 1, in oil.....11c
" French (Paris).....11c
" " in oil.....12c

Oils.
Linseed Raw.....₩ gal. casks, 63c. bbl., 64c
" Boiled..... " 68c. " 69c
Whale, Crude..... "
" Bleached Winter..... " 75c
Sperm, Crude.....bbl. 1·65
" Winter unbleached..... " 1·90
" " Bleached..... " 2 00
Seal, Extra Refined..... "
Lard, Pure Winter..... " 1·30
" Spring..... " 1·20
Cotton Seed, Crude..... " 60c
" Southern Yellow..... " 65c
" White..... "
Neatsfoot, Winter.....70c @ $1·10
Natural Lubricating.....38c @ 40c

Sundries.
Asphaltum.....5c
Benzine.....₩ gal. 16c
Chalk.....1¼c
" Block.....
Dryer, Patent, Am'n.....ass't cans, 10½c.; kegs, 9c
" " English..... " 1 c.; " 9c
Flocks.....
Frostings.....80c
Glue, White.....33 @ 47c
" Sheet.....20c
Glaziers' Points, Zinc.....9c
Gum, Copal.....36c
" Damar.....25c
" Shellac, English.....75c
" " " dark.....65c
Litharge.....10c
Pumice Stone, selected Lumps.....4 @ 6c
" powdered.....4c
Putty in bladders.....3½c
" in bulk.....3c
Rotton Stone, soft, English.....8c
Spirits Turpentine.....32c
Whiting, Spanish.....¾c

Grindstones, Emery, &c.

Walter R. Wood,
GRINDSTONES.



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SCREW WRENCHES.
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Registered March 31, 1874.

We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to *any* strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the *fact*, that in 1869 we made several *important* improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were *at once closely* imitated and sold as the *Genuine* Wrench by certain parties who seem to rely upon *our* improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be *good* evidence that we manufacture a superior Wrench, we wish the trade *may not be deceived* on the question of *originality*. Trusting the trade will fully appreciate our *recent* efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped

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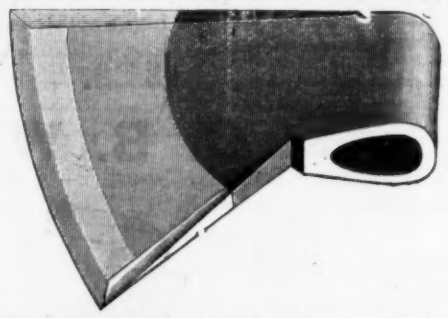

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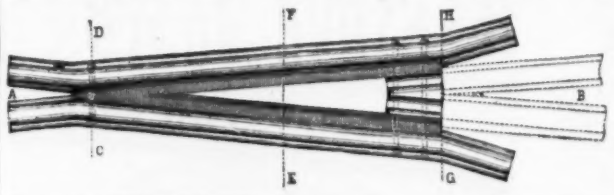

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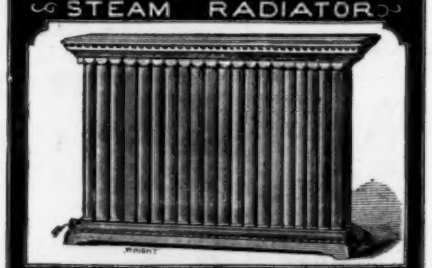

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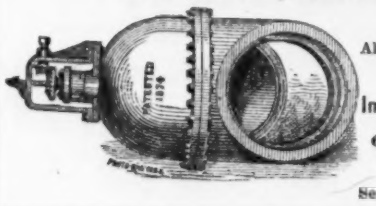

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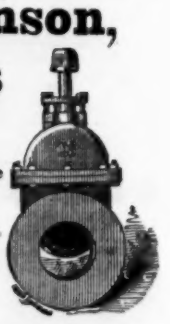

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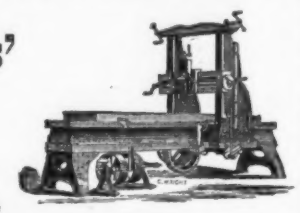

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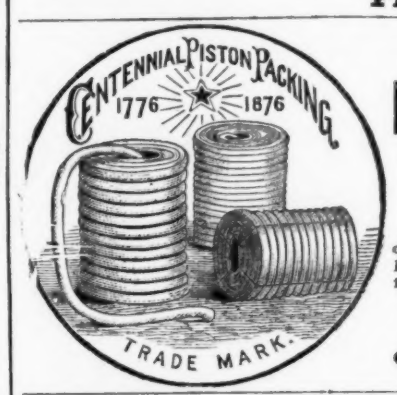
FITCHBURG, MASS.



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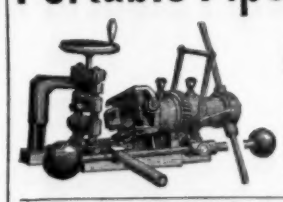

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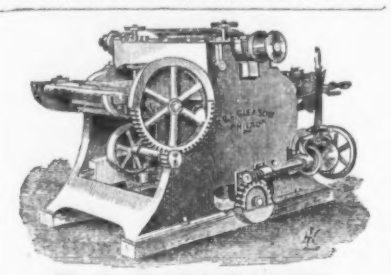

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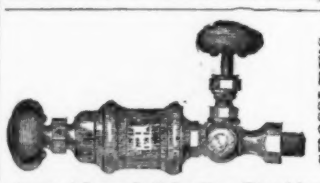

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FAIRBANKS & EWING, Masonic Hall, Phila., Pa.
FAIRBANKS, MORSE & CO., 174 Lake St., Chicago.
FAIRBANKS, MORSE & CO., 179 Walnut St., Cinn., O.
FAIRBANKS, MORSE & CO., 182 Superior St., Clev'd, O.
FAIRBANKS, MORSE & CO., 48 Wood St., Pittsburgh.
FAIRBANKS, MORSE & CO., 5th & Main St., Louisville.
FAIRBANKS & CO., 822 & 824 Washington Av., St. Louis.
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MANUFACTURERS,

E. & T. FAIRBANKS & CO.,
ST. JOHNSBURY, VT.

For sale by leading Hardware Dealers.

The Cheapest and Best Gauge Cock made.

Baltimore Bell & Brass Works,

53 & 55 Holliday Street, Baltimore, Md.,

Manufacture all kinds of

Brass Work,

And keep on hand a full supply of all

Goods used by Plumbers, Steam and Gas Fitters.

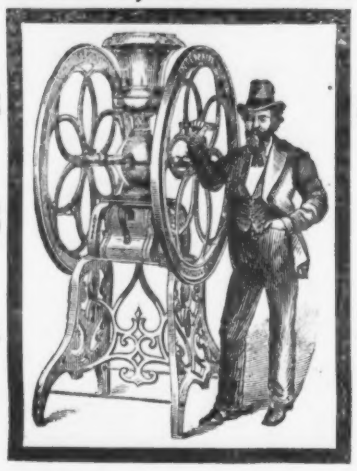
TWO SILVER MEDALS AWARDED

ENTERPRISE MANF'G CO. OF PA.

PHILADELPHIA,

FOR

AMERICAN COFFEE, DRUG AND SPICE MILLS.



Measuring Faucets

BUNG-HOLE BORERS,

TOBACCO CUTTERS

Cheese Cutters,

CORK PRESSERS

Etc., Etc.

GRAHAM & HAINES,

AGENTS,

88 Chambers St.

NEW-YORK.

NO EXTRA CHARGE FOR

NICKEL-PLATED HOPPERS WITH EAGLE DOME TOPS.

SEND FOR ILLUSTRATED CATALOGUE.

WHEELING HINGE CO.,

Wheeling, West Va.,

Manufacturers of

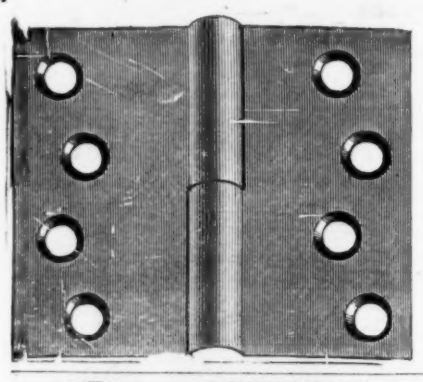
Wrought Butts, Strap & T Hinges, Wrought Hooks, Hasps & Staples, Wrought Repair Links & Washers,

GRAHAM & HAINES, Sole Agents, 88 Chambers Street, N. Y.

AMERICAN BUTT CO.,

PROVIDENCE, R. I., Manufacturers of

Cast Butt Hinges,



AND

BUILDERS'

HARDWARE.

New York Warehouse with

Messrs. GRAHAM & HAINES,

No. 88 Chambers Street.

Send for Price List.

All kinds of

SMALL CASTINGS

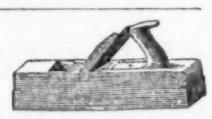
Made to order.

GREENFIELD TOOL CO.,

Greenfield, Mass.

Sole Manufacturers of the Celebrated

"Diamond" PLANE IRONS,



EXTRA PLATED TABLE CUTLERY. PATENT FORGED OX SHOES. The only Shoe made with concavity to fit hoof. BENCH AND MOULDING PLANES of every description, &c., &c. Drop Forgings to order. Address for Catalogue with stamp.

GEORGE T. RICHARDSON. FRANK H. SCUDDER.

Middleboro' Shovel Co.,

MANUFACTURERS OF

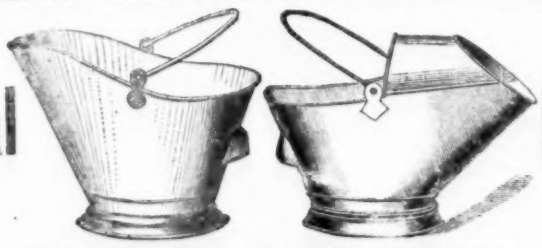
SHOVELS, SCOOPS & SPADES.

Office and Salesroom,

63 OLIVER STREET,

Works Middleboro, Mass. BOSTON.

J. CLARK WILSON & CO., New York Agents, 81 Beekman Street.

Coal  Hods.

EXCELSIOR TIN and SHEET IRON WORKS,

Successors to SMITH, BURNS & CO.,

Manufacturers of Plain, Stamped, Galvanized and Japanned

TIN WARE & SHEET IRON GOODS.

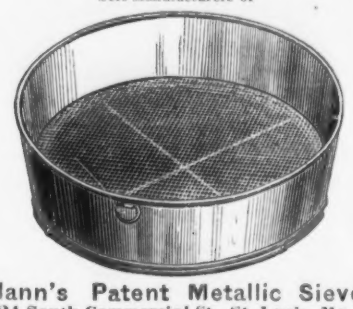
Coal Hods, Fire Shovels, Fry Pans, Water Pails, Well Buckets, &c., &c.

Factory and Warehouse, 47, 49, 51 and 53 South 5th Street, BROOKLYN.

Office and Sample Rooms, 66 Beekman Street, NEW YORK.

R. J. MANN & CO.,

Sole Manufacturers of



Mann's Patent Metallic Sieve,

24 South Commercial St., St. Louis, Mo.

The best sieve in use. To be had of all dealers.

A full assortment of these goods kept in stock at 88 Chambers Street., N. Y.

GRAHAM & HAINES, Sole Agents

SAMUEL LORING'S

PLYMOUTH TACK AND RIVET WORKS

PLYMOUTH, MASS., manufacturer of

TACKS, BRADS, NAILS AND

RIVETS.

Swedes and Common Iron Tacks; Leathered, Carpet Brush, Lace and Gimp Tacks; Finishing, Hungarian, 2d 2d and 3d Fine, Trunk, Clout, and Cigar Box Nails; Blued and Tinned Trunk Nails; Zinc, Iron, Copper and Steel Shoe Nails; Brads and Patent Brads; Glaziers' Points &c., &c., &c., COPPER, BRASS AND IRON RIVETS, of all kinds. Coopers' Rivets, from 1d to 6d, in casks of 100 lbs. each. Hose, Belt and Shoe Rivets and Burs. Oval and Countersunk Heads of extra lengths, made to order. SHIP AND BOILER RIVETS OF ALL SIZES AND LENGTHS

COBB & DREW,

Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets - Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk Clout and Cigar Box Nails, &c. Rivets made to Order

NEW YORK AGENCY

Grundy & Kenworthy

HARDWARE.

165 Greenwich Street.

Agent for the Philadelphia Star Carriage and Tire Bolts

FLUTING MACHINES.

The Celebrated K. F. M.

Manufactured for the Trade by

HENRY SOMMER.

8 to 12 Pearl Street, NEWARK, N. J.

Established in 1836.

Shelton Company,

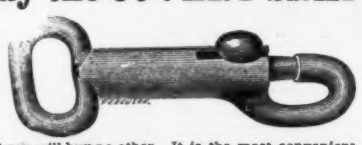
Manufacturers of every variety of

TACKS & SMALL NAILS,

Carriage, Machine, Plow, Stove and Tire Bolts, Coach Screws, Bed Screws, &c.

BIRMINGHAM, CONN

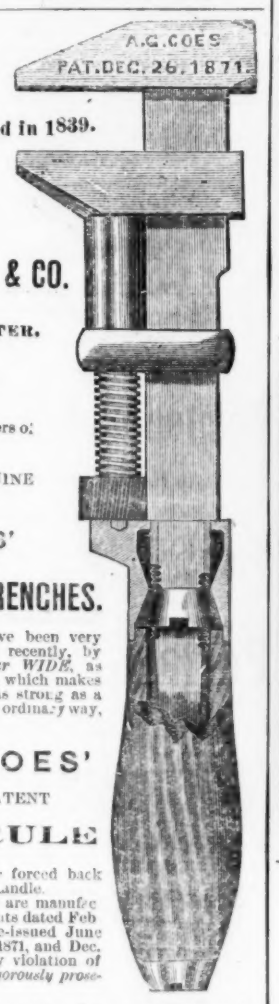
Buy the COVERT SNAP



And you will buy no other. It is the most convenient, durable, safe and reliable Snap ever used. It has a brass coil spring that is four times as long as any other coil spring snap, and is enclosed in the barrel back of the bolt, making a snap which works freely under all circumstances, and without danger of having its parts broken or disarranged. We manufacture all sizes of Harness Snaps and Round Eye Snaps, and Covert's Patent Thimble to go on rope for Cattle and Horse Ties. Also other goods.

Send for price list and circulars.

HOLD BACK & SNAP CO., Troy, N.Y.



Established in 1839.

A. G. COES & CO.

WORCESTER,

Mass.,

Manufacturers of

THE GENUINE

COES'

SCREW WRENCHES.

Our goods have been very much improved recently, by making the *Bar WIDE*, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'

NEW PATENT

FERRULE

Which cannot be forced back into the handle.

Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 29, 1871), May 2, 1871, and Dec. 26, 1871, and any violation of either will be *vigorously prosecuted.*

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.

The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS, IMPORTERS AND DEALERS IN

GENERAL HARDWARE.

AGENTS FOR THE

Patent Bessemer Metal Wood Screws,

MANUFACTURED BY

UNION STEEL SCREW CO.,

CLEVELAND, OHIO.

We are prepared to furnish these Screws at manufacturers' prices, either Bright or Annealed, and will warrant them the strongest and most perfect Wood Screws in market.

In making orders, please state whether Annealed or Bright are wanted (we consider the former preferable); also, if it is desirable to have them shipped direct from Cleveland, Ohio. We deliver there or in New York, free of freight.

QUACKENBUSH, TOWNSEND & CO.,

Hardware, Cutlery, &c.

59 & 61 Reade Street, N. Y.

Depot for THOS. JOWITT & SONS, (Sheffield, England,) FILES and HORSE RASPS.

Rough & Ready And CLIPPER SCYTHES, Warranted.

Manufacturers of the

CHALLENGE DOOR & GATE SPRING.

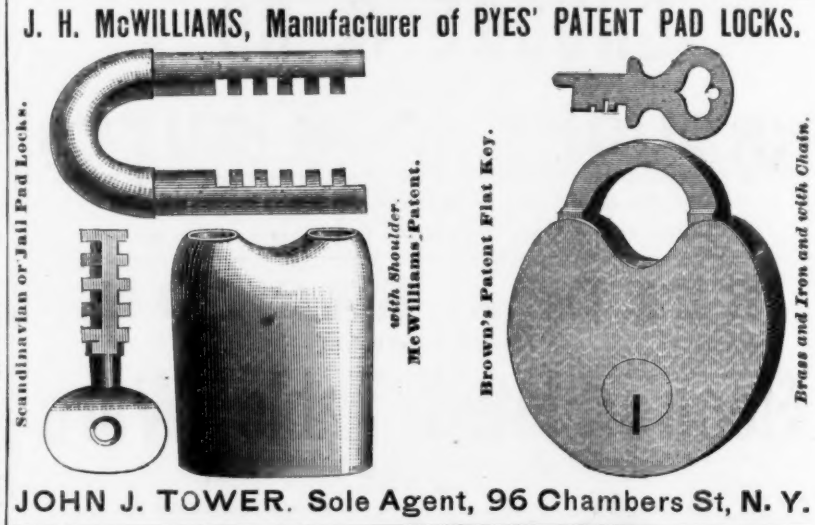
Patented March 4, 1873.

Agents for Norwich Lock MFG. CO.

"BEAVER" (American) FILES and HORSE RASPS.

"WIDE AWAKE" AXES.

J. H. McWILLIAMS, Manufacturer of PYES' PATENT PAD LOCKS.



JOHN J. TOWER. Sole Agent, 96 Chambers St, N. Y.

CAPEWELL'S GIANT NAIL PULLER.

Saves Boxes, Nails and Labor.

Sold by all House Furnishing and Hardware Jobbers.

MALTBY, CURTISS & CO.,

MANUFACTURERS,

34 Reade Street, New York

General Agents for CAPEWELL'S LITTLE GIANT TACK HAMMER.

STURTEVANT

Pressure Blowers, Fan Blowers and Exhaust Fans.

10,000 SOLD IN SIX YEARS.

SEND FOR ILLUSTRATED CATALOGUE.

B. F. STURTEVANT, 72 Sudbury Street,

BOSTON, MASS.

BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of **Shank, Socket Firmer, and Socket Framing Chisels,**

PLANE IRONS.

Gouges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 0 per cent. per annum.

Anvils.—Solid Cast Steel.....₩ ℔ 14c
Peter Wright's, (Advanced April 1st.) ₩ ℔, gold, 11½c
Wilkinson s..... " 11c
Eagle.....list 11 cents—dis 20 @ 20&10 %
Apple Parers.—Union.....per doz $7 00
Victor..... " 7 75
Domestic..... " 7 75
Reading..... " 7 75
Bay State Paring, Coring and Slicing..... " 15 00
" " Peach Parers..... " 10 50
Axes.—Mann s Light.....Per doz. $12 00 @ 11 50
Hunt's Light..... " 14 00 @ 12 50
Red Indian, all sizes..... " 12 00 @ 11 50
Red Chieftain, all sizes..... " 12 50 @ 12 00
Crown Prince..... " 12 50 @ 12 00
Augers and Auger Bits.—Pierce's Pat. Twist Bits.....dis 30 %
Douglass' & Ives' Bits.....dis 40&10 %
Connecticut Valley Auger Bits.....dis 40&10 %
Cook s Bits.....dis 40 10&10 %
Jennings' Bits.....dis 10 %
Bates' Nut Augers.....dis 40&10 %
Douglass' & Ives' Augers.....dis 40&10 %
Watrous' Ship Augers.....dis 10&15 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearns' Patent Hollow Augers.....dis 25 %
Balances.—
Landers, Frary & Clark's..... } Sold on Morton's new
Morton's..... } List.....dis 50 %
Chattillon's.....
Common Spring with Hook..... ₩ doz $1 38 @ 2 00
Bells.—Ievin Bros. Mfg Co. Light Hand Bells.....dis 70 %
Common (Tissue Paper Weight).....dis 70&10 %
Swiss Pattern Hand Bells.....dis 50 %
Connell's Door Bells.....dis 50&5 @ 50&10 %
Gt. Western & Kentucky Cow.. dis 50&10 @ 50 10&5 %
Boring Machines.—Bates' Mfg. Co., complete with augers.
Douglas Mfg. Co., complete with augers..dis 20 @ 25 %
Common Boring Machines, no Augers...$4 00 @ 3 75
Angular " " ..... 5 00 @ 4 75
Bolts.—Eastern Carriage Bolts.....dis 75 %
Western " " .....dis 75 %
Philadelphia " " .....dis 60 %
" Eagle, (Coleman's).....dis 60 %
Wrought Shutter, Stanley.....dis 50 @ 50 & 10 %
Braces.—Barber s.....dis 40&5 %
Backus.....dis 50 %
Bartholomew s American Ball.....dis 10&10 @ 15&10 %
Snoffard.....dis 50 %
Butts.—Cast Fast Joint, Narrow...dis 25&10 @ 30&10 %
" " Broad.....dis 35&10 @ 40&10 %
Cast Fast Loose Joint.....dis 45&10 @ 50&10 %
" Acorn, Loose Pin.....dis 4 0&10 @ 45&10 %
" Mavers & Parliament.....dis 35&10 @ 40&10 %
" Acorn Jap'd.....dis 45&10 @ 50&10 %
Wrought Loose rin.....dis 35 %
" Table Hinges and Back Flaps.....dis 37½ %
" Narrow.....dis 30 %
" Loose Joint.....dis 35 %
Parker's Blind Butts.... } Discount 60 %; by the case
Sheperd s " .... } 60&10%.
Garretson's " ....
Clark's " ....
Lull & Porter's Hinges....dis 60 %; by the case, 60&5 %
Garretson's Blind Butts Light No. 0.... } Discount 60 %
" Lull & Porter Pattern } By the case
Cherrytree Blind Butts ..... } 60&10 %
Chains.—German Halter.....dis 30 %
" Coil.....dis 30 %
Galvanized Pump..... net 13 @ 13½c
Best Proof Coil Chain—
₩ ℔... 14 10¼ 9½ 9 8¾ 8½ 8c gold
3-16 ¼ 5-16 ⅜ 7-16 ½ ⅝ in.
By the cask, 560 lbs., ¼c per lb. less Common Chain, ½c per lb. less.
Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang " .....dis 40&10 @ 50 %
Beaty s Framing and Firmer.....dis 2 %
Casters.—Iron Bed.....dis 30&10 @ 40 %
Porcelain Wheel Bed.....dis 40&10 @ 50 %
Iron and Brass Wheel Plate.....dis 40 @ 40&10 %
Porcelain Wheel " .....dis 50 @ 50&10 %
Clothes Wringers.—Universal.....per doz $72 00
Novelty..... " 72 00
Discount on 2 dozen lots, $2 per dozen.
Coffee Mills.—Common Box and Side.....dis 15 %
Patent Box and Side.....dis 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co. s.....dis 60 %
Adjustable Handle.....dis 10 @ 45 %
Beatty.....dis 15 @ 20 %
Fry Pans.
Tinned.....dis 40 @ 45 %
₩ doz...$3 50 4 00 4 50 5 00 5 50 6 50 7 50 9 00 10 00
No..... 0 1 2 3 4 5 6 7 8
Burnished.....dis 40 @ 45 %
₩ doz..$3 00 3 75 4 25 4 75 5 25 6 00 7 00 8 00 9 00
No..... 0 1 2 3 4 5 6 7 8
Files.
Nicholson Mill Files.....new list
" Bastard..... "
" Taper..... "
Butcher's Mill (Advanced March 8th)...$5 25 to £ gold
" Bastard..... 5 25 to £ gold
" Taper..... 5 25 to £ gold
Fluting Machines.
K. F. M.—4½ in. rolls, $5 50.....dis 15 %
" —6 in. rolls, $6 50.....dis 15 %
Mrs Knox—4 in. rolls, $5 75.....dis 20 %
" —6 in. rolls, 7 00.....dis 20 %
Hammers.
Yerkes & Plumb's.....dis 15 %
Hammond & Son's.....dis 15 %
Veree.....dis 20 %
Hatchets.
Beatty's.....dis 15 @ 20 %
Shingling and Half. { ₩ doz...$7 00 7 50 7 75 8 00
{ No..... 1 2 3
Yerkes & Plumb.....dis 15 %
Shingling and Half. { ₩ doz...$7 00 7 50 8 00 8 50
{ No..... 1 2 3 4
Claw.... { ₩ doz..... $7 50 8 00
{ No..... 1 2 3
Hinges.
Strap and T. (Changed March 24).....dis 40 %
Horse Nails. Nos. 6 7 8 9 10
Ausable..... 27 25 24 23 22
Globe..... 28 26 25 24 23
Brundage..... 26 24 23 22 21
Nos. 5 6 7 8 9 10
Putnam..... 32 28 26 25 24 22
On Ausable, Globe and Brundage 1000 ℔ lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45&5 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise.....dis 40 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 40 %
Extra discount for cash 2 %
Scandinavian Pad Locks.
₩ doz.....$10 50 10 50 12 00 12 00 15 00 15 00 } dis 15 %
No..... 9 9½ 10 10½ 11 11½ }
₩ doz..... $18 00 18 00 22 00 22 00 } dis 15 %
No..... 12 12½ 13 13½ }
Trunk Locks.....dis 5 @ 10 %
Thumb and Roggens Latches.....dis 25 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60&10 @ 65&10 %
Lincoln's " .....dis 40&10 @ 50 %
Landers, Frary & Clark's Petroleum.....dis 15&10 %
Taylor's Petroleum Faucets.....dis 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 20 %
Woodruff.....dis 2 %
Stowe.....dis 20 %
Hale's.....dis 35 %
Stuffers.....dis 20 %
Planes.—Auburn Tool Co., "Bench".....dis 40 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plumbs and Levels.
Adjustable.....dis 60&10 %
Non-Adjustable.....dis 60, 10&10 %
Plane Irons.—American.....list net
Butcher's.....gold £, $5 50
Picks.—Philadelphia.....net
Pittsburgh.....net
Rules.....dis 60, 10&10 @ 70 %
Rakes.—Cast Steel Garden.....dis 40 @ 40&5 %
Malleable Garden.....dis 40 @ 40&5 %
Wood Head Iron Teeth.....dis 40 %
Steelyards.—American Pattern.....dis 15 %
₩ doz.....$5 50 7 00 9 00 10 00 11 00 12 00
No..... 50 100 150 200 250 300
English Pattern.....dis 15 %
₩ doz.....$7 00 8 67 10 67 12 67 14 67 16 67
No..... 50 100 150 200 250 300
L. F. & C. Excelsior.....dis 10 %
₩ doz.....$9 00 10 00 12 00 15 00 18 00 21 00
No..... 50 100 150 200 250 300
Scythes.—Golden Clipper, Damascus Blade. Boxed and Sharpened.....₩ doz. $10 00 net
Golden Clipper No. 10, Boxed and Sharpened.....₩ doz $9 75 net
Green Clipper No. 5, Boxed and Sharpened.....₩ doz $9 50 net
Common Scythes.....₩ doz $7 50 @ 9 00
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Disston's Cross Cut.....dis 15 %
Disston's Hand.....dis 12½ %
W. McNiece s H'd, Cross-Cut & Circ'r, new list..dis 15 %
Boynton's Lightning, new list.....dis 40 %
" Champion.....dis 45 %
Shovels and Spades.
Rowland's Plain Back, Jan. 23d.....dis 30 @ 35 %
" Back Strap " .....dis 30 @ 35 %
Oliver Ames & Sons.....dis 20 %
Brady Shovel Co.....dis 2 0&5 %
Sad Irons.—Richmond (polished face).....per lb. 8½c
Richmond (polished face)..... by the cask " 8¼c
Stone.—Arkansas Oil, No. 1..... ₩ ℔ $1 38
Turkey Oil, No. 1..... " 1 00
Washita Extra..... " 30c
" No. 1..... " 22c
" " 2..... " 18c
..... " 5½c

Screws.—Iron.....new list, sept. 1st, 1875, dis 30 %
brass.....dis 30 %
Spoons.—
Plated.....dis 40&10 @ 50 %
Britannia, Boardmans (new list).....dis 50&10 %
" Parkers (old list).....dis 50 %
German Silver.....dis 30 %
" Light.....new list dis 35 %
Lalance & Grosjean Iron.....dis 70 %
Springs.—Gray's Door.....dis 50 @ 50&10 %
Torry's Door.....dis 50 @ 50&10%
Stocks and Dies......dis 10&5 %
Stove Polish.—Gem.....₩ gross, $5 00
Onyx..... " $5 00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 72½ %
" " by the case...dis 72½&7½ %
Clout and Finishing Nails.....7½ %
" " by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 30 %
Imitation " " .....dis 30 %
Vises.—Solid Box. currency..... ₩ ℔ net 14c
Wrenches.—Coes Genuine.....dis 40 @ 40&5 %
Coes Imitation Wrought Bar .....dis 50&10 & 10 %
" " Malleable Bar.....dis 60&10 %
" " (Kellogg) Malleable Bar.....dis 65&10 %
Tafts Pattern (Wrought Bar).....dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " " Improved Baxter.....dis 25 %
" " " Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....(Advanced April 24th)...dis 40 %
No. 19 to 26..... " " ...dis 47½ %
No. 27 to 36..... " " ...dis 52½ %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 25 %
Galvanized Wire No. 1 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
August 9, 1875.

Augers—Snell Mfg. Co.....dis 25 %
Axes—Francis.....11 50
Bits, Auger—Snell Mfg. Co.....dis 25 %
Phœnix.....dis 40 %
Bells, Cow—Law s Genuine.....dis 30 %
Braces—Bit, Spofford's Patent.....dis 50 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Pat.dis 35 & 4 mos.; 35&5 % 30 dys
Butts—Brass.....dis 3 %
Wrought Narrow.....dis 30 %
" Broad, Loose Joint.....dis 35 %
" Table and Back Flaps.....dis 30 %
Wrought Butts, Loose Pin.....dis 35 %
Belting—Rubber.....dis 30 @ 10 %
Leather, new list, oak tanned.....dis 20 %
Brick—Bath (box of 2 doz) Best English.....$1 25
" Rutherford.....$1 00
Can Openers—Sprague's.....dis 50 %
Cases—Parlor Coal Hod.....dis 15 %
Chalk—White, Carpenter s .....₩ gross, 57c
Red, Carpenter's ..... " 90c
Chisels—Firmer Socket.....dis 60, 10&10 %
Framing Socket.....dis 60, 10&10 %
Corner Socket Chisels.....dis 60, 10&10 %
Slick's Carpenters'.....dis 60, 10&10 %
Castings—Malleable.....dis 60, 10&10 %
Egg Beaters—"Peerless".....₩ ℔ 9¾c
"Centripetal".....per doz $3 00
Elbows—Corrugated..... 5 5½ 6 7 } dis 10 %
Charcoal.....$3 50 4 50 5 25 6 50 }
Russia..... 7 00 9 50 12 00 14 00 }
Files—Maischoss Bros.....dis 50 %
Fluters—Geneva Hand.....₩ doz. $15 00
Freezers Ice Cream—" Champion .....dis 33½ %
Hammers—Henry W. Kip's.....dis 10 %
Hinges, Gate—Shepard's.....dis 40&10 %
Hinges—Window Blind—
Shepard s and Standard.....dis 60&10 %
Wrought Strap and T.....dis 33½&10&5 %
Hods, Coal—Plain, Black and Galvan'd...new list dis 15 %
Funnel, Black and Galvanized..... " dis 15 %
Fancy and Helmet..... " dis 15 %
Sad Irons.....3½c
Kettles—Brass.....₩ ℔ 25c
Copper, "Hand Made".....38c. @ 40c.
Enameled.....dis 50&10 %
Knives. Drawing—Oval No. 1.....dis 60, 10&10 %
Razor Blade.....dis 60&10 %
Lanterns "Peerless.....No. 4 5 10
₩ doz $36 00 $10 50 $13 75 dis 10 %
Tuouiar.....$11 00
" with Guards.....11 50
Machines—Apple Paring, "Keystone".....7 75 ₩ doz
Machines—Boring, Snell's.....dis 20 %
Mills, Coffee—Box and Side, common.....dis 15 %
Box Union and Eagle.....dis 15 %
" American.....dis 20 %
Molasses Gates—"Self Measuring".....dis 20 %
Nails—Clout and Finishing.....dis 7½ %
Shoe.....dis 7½ %
Horse, Ausable.....No. 5 7 8 9 10
30 27 25 24 22 22c
" " Pointed & Polished.....add 1c ₩ ℔
" " 1000 lbs.....dis 5 %
" Clinton.....No. 6 7 8 9 10
21 19 18 17 16c
Packing—Rubber.....dis 30 @ 10 %
Paint—White Lead, U. S. Gov't.....₩ ℔ 8½c
Pans—Dripping.....₩ ℔ 10c
Rivets—Iron, Black and Tinned.....dis 25&7½ %
Screws—"American Screw Co"—
Flat Head, Iron.....dis 62½ %
Flat Head, Brass.....dis 52½ %
Skates and Straps—White's.....dis 20 %
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 50 %
Britannia.....dis 50&10 %
Squares—Steel and Iron.....new list 50 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Stove Polish—Gem.....₩ gross, $4 5&4 50
" Dixon's..... 6 00
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Vases—Palace Coal.....dis 15 %
Vises—
Parallel, Buffalo...Old pattern, dis. 30 %; new, do.dis 20 %
Ware—French, Tinned and Iron.....dis 20 %
Stamped and Japanned.....dis 5 %
Cast Iron Hollow.....dis 40 %
Wire—Bessemer Steel.....dis 10 %

Tin Plates.—Add for each X
10x14, IC. Charcoal...$10 00 | 14x20 I.C. terne.....$ 9 50
12x12, " ... 10 50 | 20x28 C. " 20 00
12½x17, " ... 9 50 | 20x28 X. " 25 00
14x20, " ... 11 00

Pig Tin—Straits.....24c @ 25c
Bar Tin.....26c
Solder—No. 1, Crook's.....16 c
Sheet Zinc—
"Lasalle".....570 100 ℔ casks
$10 75 11 00 ₩ 100 ℔s
Sheets.....$10 75
Babbitt Metal.....₩ ℔ 12c
Iron Wire—Bright and Annealed.....dis 45 %
Coppered.....dis 40 %
Tinned.....dis 25 %
Tinned Broom, { Nos. 20 21 22 } ....dis 33 %
{ 20c 21c 21c }
Copper—Sheathing 14 @ 18 oz.....₩ ℔ 30c
Planished.....₩ ℔ 37c @ 39c
Bottoms.....₩ ℔ 34c
Bolts.....₩ ℔ 31 @ 34c
Brazers' Sheets.....₩ ℔ 31 @ 32c
Sheet Iron.—
18 Common.....$4 05
24 Common.....4 25
26 Common.....4 45
24 W. D. Wood & Co., Smooth Finish.....5 80
Am. Russia.....A. B.
Gen. Russia, No. 1 stained.....14c 11c
" clean.....16½c
Galvanized.....dis 30 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.
August 2d, 1875.

Tin Plate.—I. C. 10x14 Charcoal.....$10 50 @ 11 50
I. X. 10x14 Charcoal..... 12 50 @ 14 00
I. C. Terne 14x20..... 9 50 @ 11 00
I. C. Terne 20x28..... 20 50 @ 22 00
I. C. 20 inches Continuous..... 21 00
Block Tin.—
Pig.....₩ ℔ 26c
Bars.....₩ ℔ 27c
Solder.—
A 1.....₩ ℔ 16c
Roofing.....₩ ℔ 17c
S. & Co.....₩ ℔ 21c
Lead.—Pig.....₩ ℔ 7c @ 7¼c.
Bar.....₩ ℔ 8½c
Copper.—
Ingot.....₩ ℔ @ 24c
Planished..... " @ 38c
Sheathing..... " @ 31c
Copper Drops..... " @ 34c
Sheets.. 6 to 7 lb..... " @ 37c
" 8 to 9 lb..... " @ 35c
" 10 to 12 lb..... " @ 33c
" 13 lb. up..... " @ 31c
Copper Bottoms..... " @ 35c
Zinc. Cask. 500 to 1000 lbs.....₩ ℔ 10½ @ 10¾ c
Case, 100 lbs..... " 10¾ @ 11 c
Slab..... " 7½c
Brass.—Roll. No. 6 to 20.....₩ ℔ 30c
Roll, No. 20 to 38..... " 35c
Wire, No. 0 to 20.. " 35c
" 20 to 25..... " 40c
Babbit Metal.—Sellew & Co..... " 30c
Aliens'..... " 20c
Markel..... " 12c
Antimony.....₩ ℔ 17c
Bismuth.....₩ ℔ $4 00
Nickel.....₩ ℔ $3 50
Russia Iron.—Bundle.....₩ ℔ 17c
Less than bundle.....₩ ℔ 18c
No. Stained.....₩ ℔ 16c @ 16c

Sheet Iron.

	Com. B.	Fin. S. I. U.	Smooth D Re'fd.
15 to 20	4c	5 10c	7 10
22 to 24	4 10c	5 20c	7 20
26	4 30c	5 30c	7 30
27	4½c	5½c	7 50
30	5½c		

Galvanized Iron.—Bundles.....dis 27½ %
Nos. 18 to 20..... 15c | No. 26.....16c
" 22 to 24..... 15c | 27.....15c
Bar Steel.—Silver, ₩ ℔ 16c; Crescent, 21c.
Iron Wire.....dis 33 %
Enameled Ware.....dis 50 %

One Piece Corrugated Elbows.....dis 10 %

Charcoal Iron.		Russia Iron.	
4½ inch.....	₩ doz $2 50	4½ inch.....	₩ doz $5 00
5 "	" 3 50	5 "	" 7 00
5½ "	" 4 50	5½ "	" 7 50
6 "	" 5 50	6 "	" 12 00
7 "	" 6 50	7 "	" 14 00

Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %

	₩ doz.		₩ doz
2-inch.....	$1 75	2½-inch.....	$2 75
3-inch.....	2 25	3½-inch.....	3 25
4-inch.....	2 50	4½-inch.....	3 50

Sheet Iron Bread Pans.....₩ ℔ 34c
American Broilers.....₩ doz. $3 50
Tinmen's Machines.....dis 5 %
Sad Irons.....₩ ℔, 3½ @ 3¾c
Brass Kettles.—Ansonia.....45c
Dog Irons.....3¼c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent. Iron, standard list assorted sizes, for large orders, specifications to include Bands, small Rounds and Ovals, 75c. rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4½c ₩ ℔ net
Iron Wedges.....4½c ₩ ℔ net
Norway Nail Rods.....8¼c ₩ ℔ net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....4¼c ₩ ℔ net
Beetle Rings.....8 c ₩ ℔ net
Fence Pickets—
¾ round, bent to shape, 25c ₩ ft. of fence, less 15 % off net.
Discount off Standard List.
Carriage and Tire Bolts.....15 % off net
Carriage and Tire Bolts delivered on cars or boats in Pittsburgh.
Stove Bolts.....20 % off net
Machine and Square Head Bolts.....40&10 % off net
Coach and Lag Screws.....40&10 % off net
Bolt Ends.....40 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ¾ in.....8¼c ₩ ℔ off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....6¾c ₩ ℔ off net
Washers, all made from new band iron, small sizes, from 3-16 to ¾ in.....9¾c ₩ ℔ off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅜ in.....7¾c ₩ ℔ off net
Nuts and Washers in 25 lb. boxes, ½c ₩ ℔ ex. Nuts and Washers in lots less than one keg each size, ½c ₩ ℔ ex. Nuts and Washers in 5 lb. boxes, 1c. ₩ ℔ ex. net prices.
Standard Caps, for Plows.....5¾c. ₩ ℔ net
Iron Harrow Teeth, in lots of 1 ton or more, packed in 200 lb. boxes, 1 in. diam. 3¼c ₩ ℔ net; ⅞ in. diam. 3¼c ₩ ℔ net; ¾ in. diam. 3¾c ₩ ℔ net.
Patent Headed Harrow Teeth, packed in boxes ½c ₩ ℔ ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5c ₩ ℔ net; 9-16 in. diam. 6c ₩ ℔ net; ½ in. diam. 7c ₩ ℔ net. 1c ₩ ℔ extra when less than 1 keg of each size is ordered.
Strap & T Hinges...33½&10 % off net, delivery as custo'ry
Screw Hitching Rings.....$5 25 ₩ 100 net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₩ ℔ 3¾c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 4 c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 4½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long..... " 4½c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long " 5 c net
Bridge bolts with upset ends.....¼c. ₩ ℔ extra
Wrought iron plates, punched.....4½c. ₩ ℔ net
Cast Iron Washers.....₩ ℔ 3¾c net
Duck Nest Tuyere Irons.....$14 50 ₩ doz net

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₩ set of 8 bolts.. 45c
12 " ½ " " 8 " .. 55c
10 " 9-16 " " 8 " .. 65c
12 " 9-16 " " 8 " .. 70c
14 " 9-16 " " 8 " .. 80c
10 " ⅝ " " 8 " .. 80c
13 " ⅝ " " 8 " .. 80c
14 " ⅝ " " 8 " .. 90c
16 " ⅝ " " 8 " .. 1 00
18 " ⅝ " " 8 " .. 1 10
20 " ⅝ " " 8 " .. 1 20
5c ₩ set for each additional inch over 14 in All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....15c
" " wide track, each.....17c
Single Tree Irons, ₩ set of four pieces.....30c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set.....45c
" " 3 " " 50c
" " 3½ " " 55c
" " 3¾ " " 60c
Wagon Brake Ratchets, each.....14 c
" " finished with guard, each..40 c
Wrought Hammer Straps, heavy pattern, each.....13 c
" " light " each.....12 c
" Rub Irons, each.....9 c
Stay Chain Hooks, each.....5½c
Double and Single Tree Clips, figure 1, each.....8 c
" " " 2, each.....9 c
" " " 3, each.....11 c
Axle Clips, Round Part ⅝, Flat Part 1¼, each.....8c
Wagon Clevis, including Pin, complete, each.....10c
Pole Caps, each.....24c
Single Tree Hooks, Nos. 1 and 2.....4½c
Strap Bolts, Rods, single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks, Clevis and Pin. Clips, Single Tree Hooks, and Pole Caps, in lots of 50 sets.....dis 15 %
Wagon Box Staples, 1¼ to 2¼ in. to clinch. ₩ 1000 $11 00 net
" " " Bevel Box Iron, to rivet on, ₩ 1000 7 50 net
Neck Yoke Eyes, each.....4¼c net
" " with ⅝ rings, each.....7¼c net
King Bolts, ⅝, 1, 1¼, and 1¼ in. diam.....₩ ℔ 4¼c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¾ in. diam. all lengths..... " 8¼c net
Wagon Rivets, 3-16 in. diam., all lengths..... " 9¼c net
" ¾ to 1 inch long..... ₩ ℔ 1c extra
" & Nails, in 5 ℔ paper boxes..... " 1c extra
" in 25 ℔ wood " ..... " ¼c extra
Wagon and Hinge Nails, ¼ in.....₩ ℔ 17 c net
" " " 3-16 in..... " 19 c net
Wagon Rivets and Nails, in less lots than one keg each size..... " ¼c extra
Double Tree Plates..... " 5c net
Coupling " ..... " 5c net
Tongue " ..... " 8¾c net
Neck Yoke Plates..... " 10¼c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₩ ℔ as Band Iron.
Wagon Chains, Stay, Lock and Tongue, 5-16 in, ₩ ℔ 10¼c net. ¼ in., 11¼c. net.
Above prices are free on board cars in Pittsburgh. Subject to change of market, without notice.

DETROIT.

(Reported by Messrs. Jewett & Root.)
August 30, 1875.

Tin Plate.—Best Charcoal
IC. 10x14.....$10 25
IX. 10x14..... 13 00
XX. 10x14..... 15 75
IC. 12x12..... 10 75
IX. 12x12..... 13 50
IC. 14x20..... 11 25
IX. 14x20..... 14 00
XX. 14x20..... 16 75
XXX. 14x20..... 19 50
XXXX. 14x20..... 22 25
Dc. 100 Plate..... 9 75
DX " 12 50
DXX " 15 25
DXXX " 18 00
DXXXX 100 Plate.. 20 75
IX. 14x14..... 21 50
IC. 10x14 W..... 9 75
IX. 10x14 W..... 12 50
Roofing Tin.—Best Char.
IC, Terne, 14x20.....$ 9 50
IX, " 14x20..... 12 25
IC, Terne, 20x28..... 20 00
IX, " 20x28..... 25 00
Coke Tin.—
IC, 10x14 Coke.....$ 9 25
IX, 10x14, Coke..... 12 00
IC, 14x20, " 10 25
Solder.—No. 1..... 16c
No. 2..... 15c
Pig Tin.—
Large Pigs.....24c
Small Pigs.....25c
Bars.....26c
Bright Wire.
63 lbs. in bdl.....dis —
Copper.—
Sheathing.....31c
Copper Bottoms.....32c
Planished Copper.—
Sheathing, 14x48.....38c
Boiler Size, No. 7.....40c
" " No. 8.....40c
" " No. 9.....40c
Sheet Iron.—
No. 18 Am. Com.....4 00
No. 24 Am. Com.....4 20
No. 26 Am. Com.....4 40
No. 27, Am. Com.....4 60
W. D. WOOD'S & CO. S SHEET IRON.—
Nos. 15 to 20 Smooth $5 00
" 21 to 24..... 5 20
" 25 & 26..... 5 40
" 21 to 24 Charl'..... 6 70
" 25 & 26 " .. 6 90
RUSSIA.
Genuine.....17c
Imitation.....14c

Steel.

THREE 1st CLASS PRIZE MEDALS, CLASSES 1, 21, 22, at Exhibition of Industry LONDON, 1851.

MEDAL OF HONOUR, SOCIETY OF ARTS & INDUSTRY, LONDON, 1856.

1st CLASS PRIZE MEDAL, CLASS 1st UNIVERSAL EXHIBITION OF INDUSTRY PARIS, 1855.

COCKER BROTHERS

(Limited.)

SUCCESSORS TO

SAML. COCKER & SON,

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SHEFFIELD, ENGLAND.

MANUFACTURERS OF

CAST, [illegible], SHEET, AND BLISTER STEEL, OF EVERY DESCRIPTION.

BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES; Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS, HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS, FISH HOOKS, NEEDLES. &c.

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AND IMPORTERS OF IRON

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PRINCIPAL DEPOTS:

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ST. LOUIS, No. 714 North Second Street.

AGENCIES

PHILADELPHIA, Jas. C. Hand & Co.....PROVIDENCE, Nightingale & Kilton.
CHICAGO, Crerar, Adams & Co.....NEW ORLEANS, Folger & Co.
CINCINNATI, Augustus Wessel.....SAN FRANCISCO, Huntington, Hopkins & Co.

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Successor to **JOSHUA MOSS & GAMBLE BROS.**

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MANUFACTURER AND IMPORTER OF

STEEL AND FILES.

Principal Depots: 80 John St., N. Y., and 512 Commerce St., Phila.

MOSS & GAMBLE SUPERIOR C. S. "FULL WEIGHT" FILES,

Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS' TOOLS.
Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size.
Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.
English Spring and Plow Plate Steel. Also, manufacturer of

Steel Cast Steel Shear, German, Round Machinery, Hammer, Fork and Shovel Steel

And GENERAL MERCHANT.

A. M. F. WATSON, General Agent.

WILSON HAWKSWORTH, ELLISON & CO.,

Vienna Universal Exhibition, 1873.

THE MEDAL FOR MERIT

Awarded for Excellence & Perfection in Material & Workmanship.

W. H., E. & CO. have pleasure in announcing the Award of the MEDAL FOR MERIT for their Exhibit of Crucible Cast Steel, Files, Steel Wire, Tools, &c. This is the ONLY Award to any Exhibitor of STEEL WIRE in the British Section.

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STEEL,

Steel Wire, &c, AND GENERAL MERCHANTS.

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New York, 72 John Street. *Philadelphia, 505 Commerce Street.* {Agencies:} *Boston, 21 Oliver Street.* *New Orleans, La. 111 Gravier St.*

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MINERVA AND BEAVER WORKS, WOLVERHAMPTON, ENGLAND.

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"JENKS" SPRING STEEL, "MINERVA" SWEDES, AND "ANGLO" CAST SPRING STEEL;

"JENKS" TIRE, TOE CORK, SLEIGH SHOE, BLISTER, AND PLOW STEEL;

ALSO,

"BEAVER" PLOW, TIRE, AXE, AND SHEET IRON.

VAN WART & McCOY, Agents, 134 & 136 Duane Street, N. Y.

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STEEL

For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for SPRINGS AND STAMPING COLD;

ALSO THE CELEBRATED

DOG BRAND FILES,

Unsurpassed, if equaled in quality.

Bailey Lane Works, Sheffield, England.

Warehouse, 82 John St., New York.

Established 181

HENRY MOORE, Attorney.

Steel.

SANDERSON BROTHERS & COMPANY,

(LIMITED)

DARNALL WORKS, ATTERCLIFFE FORGE, } SHEFFIELD, ENGLAND.

Sole Manufacturers of the CELEBRATED

CAST STEEL,

Warranted most SUPERIOR and UNSURPASSED for

TOOLS and GRANITE ROCK DRILLS.

A full assortment of this universally approved OLD BRAND of English Steel, and

ARMITAGE'S GENUINE MOUSEHOLE ANVILS,

For Sale by

EDWARD FRITH, 16 Cliff Street, New York.

FRANCIS HOBSON & SON,

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Sole Manufact'rs of "CHOICE" Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

JOHN HOGAN, Agent.

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Cast and Double Shear STEEL,

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table, Carving, Butcher and Shoe Knives, Turning Tools, Dies, Files, Clock or other Springs, Saws and Tools of every variety.

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In calling the attention of consumers of Steel in any of the varieties above enumerated, we would respectfully assure them of our ability to supply an article, that cannot be excelled in quality, temper, and adaptation in all respects to the various purposes for which it may be required. Half a century of practical experience in all departments of Steel manufacture, a long established reputation in England, and the Continent of Europe, and in the Eastern States principally of this Country, encourage us to solicit a universal trial of our Steel for the above or other purposes for which a first class Material, in quality, temper, and durability is needed.

G. SANDERSON & CO.,

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Particular attention is paid to quality and temper for

Files, Saws, Table and Pocket Cutlery, Augers, Shovels, &c.

ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.

Hot and Cold Rolled Sheets for Clock Springs, Corset Clasps, Pens, &c.

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Warehouse, 57 John Street, New York.

JOHN NICHOLSON & SONS,

Established 1849.

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Mowbray Steel Works, SHEFFIELD.

NEW YORK OFFICE, - - - - 88 Chambers Street.

MIDVALE STEEL WORKS.

Works and Office, NICETOWN, PHILADELPHIA, PA.

MANUFACTURERS OF

CRUCIBLE AND OPEN HEARTH STEEL,

Steel Locomotive Tires. Steel Axles of every description.

STEEL FORGINGS UP TO 8000 lbs. IN WEIGHT.

Solid Steel Castings, Hammer Dies, Frogs, Crossings, etc.

BEST TOOL, MACHINERY AND SPRING STEELS.

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WARRANTED SUPERIOR TO ANY STEEL IN THE MARKET—EITHER ENGLISH OR AMERICAN—FOR EVERY PURPOSE.

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Huntington, Hopkins & Co., San Francisco and Sacramento, Cal.
M. M. Buck & Co., St. Louis, Mo
Potter & Hoffman, Philadelphia, Pa.
Geo. Dunbar & Co., Boston, Mass.
Wood & Legzat, Hamilton, Ont.

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Sheffield Steel Works,

(Established in 1848.)

SINGER, NIMICK & CO.

Pittsburgh, Pa.,

Manufacturers of Extra Quality Tool

CAST STEEL,

Patent Rolled

SAW PLATES,

All descriptions of Cast and German

Spring and Plow Steel

Elliptic and Side Springs, Seat Springs.

AXLES, STEEL TIRE,

Plow Wings, Shares, Cultivators, Reaper Bars, ow Bars, &c., &c.

Warehouse, 83 Water and 100 First Streets.

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Crescent Steel Works,

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Manufacturers of all descrip[illegible] of

STEEL

EQUAL TO ANY IN THE MARKET.

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POWDER.

DUPONT'S GUNPOWDER MILLS,

ESTABLISHED IN 1801,

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Celebrated Eagle Ducking, Eagle Rifle, & Diamod Grain Powder.

THE MOST POPULAR POWDER IN USE.

Also, SPORTING, MINING, SHIPPING, AND BLASTING POWDER,

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LAFLIN & RAND POWDER CO.

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invite the attention of the the Hardware Trade to their facilities for delivering

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POWDER

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Newburg, Saugerties, Kingston, and Catskill, N. Y.; Scranton, Carbondale and Pottsville, Pa.; Baltimore, Md., and Platteville, Wis.

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Orange Rifle, *Orange Ducking*
Lightning, *Audubon.*

SAFETY-FUSE at wholesale.

BARR'S ELLIPTIC

Steam Trap

THE BEST IN THE WORLD

SEND FOR A CIRCULAR.

Richards & Pike.

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Engineers, Anglo-Swedish Merchants And Engineers' Agents.

First-class Makers of Machinery & Specialities, &c., desirous of extending their exports, will find it in their interest to supply us with full particulars and prices, &c., &c.

London—122 Cannon Street, E.C.

BOSTON.

(*Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.*)

Augers.—Watrous Ship.....dis 10 %
L'Hommedieu Ship.....dis 15 %
Axes.—Forester's Favorite, Bronzed.....$12 00
Blue Jackets, blue.....11 5
Excelsior, Black.....11 00
Chopper's Pride, Bronzed.....10 50
Iced Cross, Red.....10 00
Iced Cross, Handled.....12 50
Boy's Handled Blue Jackets.....12 00
Axe Handles.—Wadleigh's Oak—
A (Extra) $2·50. B (No. 1) $2·00. C (No. 2) $1·50 ₩ doz
Bells, Sleigh—
Fancy Body, Patent Leather, Cloth Bound, White Metal, 3, No. 1.....$1·70
Fancy Body, Patent Leather, Cloth Bound, White Metal, 16, No. 1.....1·80
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 3, No. 1.....·88
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 36, No. 1.....2·50
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 30, No. 1.....3·38
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 36, No. 1.....3·50
Shaft, Strap, White Metal, House Bells, extra, 6, No. 1.....per pair, 50c.
Common, 6, No. 1....." 45c.
Blind Hinges.—
Orr or Washburn's.....per hundred sets $9 50
Blind Fasts.—
Orr or Washburn's.....per hundred set $6 00
Bolts.—Carriage, Phila.. " Girard Works....dis 50&10 %
Borax.—Best Refined.....₩ ℔ 15c
Borers.—Angle, Backus'.....dis 30 %
Boring Machines.—Angle.....each $4 75
Common, Snell's quality.....each 3 75
Braces.—Barber's.....dis 40&5 %
Backus'.....dis 50 %
Spofford's.....dis 50 %
Amidon.....dis 50 %
Brackets.—Star Bronzed.....new list net
Star Japanned.....new list net
Store Shelf.....new list net
Brass Faucets.—L. F. & C.....dis 25&10 %
Butts.—Union Drilled Loose Joint.....dis 45&10 %
" " Wire Fast Joint.....dis 25&10 %
" " Acorn Loose Joint...dis 45&10 %
Brass Butts.....dis 30 %
Wrought Table Butts and Back Flaps.....dis 30 %
Wrought Narrow Butts.....dis 30 %
Can Openers—Sprague's.....dis 50 %
No. 1, Iron Handle.....$4·00
No. 2, Wood Handle.....4·50
Cartridges.—" U. S. Cartridge Co."....dis 50&10 %
Chisels.—"Buck Bros.' Sha' Goods....add 20 @ 22½ %
Socke'.....add 22½ @ 25 %
Churns.—Lightning—
Redheffer patent.....3 4 5 6 gall
per doz $22 00 $27 00 $31 50 $36 00
Coal Hods.....dis 40 %
Fancy Japanned, No. 4, 15 in., $8·00; 5, 16 in., $9·00; 6, 17 in., $10·00.
Fancy Galvanized, No. 4, 15 in., $11·50; 5, 16 in., $13·00; 6, 17 in., $14·00.
Perfection, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.
Perfection, Galv'd, No. 4, 15 in., $15·00; 5, 16 in., $16·00; 6, 17 in., $17·00.
Morning Glory, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.
Morning Glory, Galv'd, No. 4, 15 in., $15·00; No. 5, 16 in., $16·00; No. 6, 17 in., $17·00.
Compasses and Dividers.—Bemis'.....dis 35 %
P. S. & W.....dis 25 %
Cordage.—Manila (usual trade dis.).....₩ ℔, 15c
American Tarred Hemp Lath Yarn.....₩ ℔, 10c
Corn Hooks.....per doz $2·75
Cow Ties.....dis 10 %
No. 30, Open Ring, 3 foot, No. 6, with Toggle.....$3·70
No. 35, " 3 " No. 6, " Snap.....3·90
No. 40, " 3½ " No. 5, " Toggle....4·23
No. 45, " 3½ " No. 5, " Snap.....4·40
No. 50, " 4 " No. 4, " Toggle....4·85
No. 55, " 4 " No. 6, " Snap.....5·00
No. 60, " 4½ " No. 3, " Toggle....5·60
No. 65, " 4½ " No. 3, " Snap.....5·80
Crow Bars.—Iron, steel Points.....₩ ℔, 5½c
" Sweet" Steel Bars.....₩ ℔ 11c
Brown's Steel Bars.....₩ ℔ 10c
K. P. & Co. Extra Drill Steel.....₩ ℔ 15c
Dividers.—Cook's Nickel Plated.....dis 15 %
Door Springs.—Stimson's Patent.—
No. 7, Light inside doors, $12·00.....dis 25 %
No. 8, " outside " $18·00.....dis 25 %
Torrey's.....$4·00
Gem.....1, $1·00; 2, $2·50; 3, $3·00 ₩ doz
Egg Beaters.—Lightning, Redheffer pat..1 qt.. 4 qts.
per doz $8 00 $12 00
Emery.—Alden.....₩ ℔ 6½c
Wellington Mills.....₩ ℔ 10c
Files.—Earl Smith & Co.'s English.....$5 to £ gold
American.....$5 to £ currency, less 12½ %
Nicholson.....new net list
Wheeler, Madden & Clemson.....45 next
Stubb's Tapers, genuine, 3 in., $1·50; 3½, $1·62½, 4, $1·88; 4½, $2 13; 5, $2·50.
Funnel Irons.—$2·50 2·50 2·50 3·25 per doz
5, 5½, 6, 7 inch.
Deep Flange.—$3·50 3·75 4·00
5, 5½, 6 inch.
Hammers.—Maydole.....dis 12 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $9·75
" " " bell face, No. 1, $11: 1½, $9·75.
Hangers & Rollers.—Novelty.....dis 30 %
Anti-Friction.....$1 75 per pair—dis 30 %
Hatchets.—Underhill Edge Tool Co.....dis 15 %
C. F. Dowse, warranted Cast Steel—
Shingling.....0, $4·75; 1, $5·25; 2, $5·75
Claw.....1, $5·75; 2, 6·25
Lathing.....1, $5·50
Axe Pattern.....1, $7·00; 2, 7·50
Broad....0, $5·75; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75; 5, $12·75; 6 $14·75.

Hinges.—Strap and T, Stanley Works.....dis 33⅓&10 %
Plate, Loose and Fast Joint.....₩ ℔ 6c
Wrought Screw Hook.....₩ ℔ 6½c
Knobs.—Young's Imp. Silvered Glass.....dis 45 %
Lanterns.—Tubular No. 0.....$11·00
Guarded, No. 74, (with kerosene oil and candle burners).....6·25
Anti-Tubular.....8·00
Lead.—Sheet and Pipe.....9½c—less 10 %
Locks.—Norwalk Lock Co.....dis 40&5 %
Mattocks.—
K. P. & Co., axe finish, long cutter.....$13 00—net
Short cutter.....12 75—net
Meat Cutters.—" Miles's" Challenge.....dis. 20 %
No. 1, $22·00; 2, $30·00; 3, $40·00.
Metal.—Babbitt. No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ₩ ℔
Nails.—10d and larger.....$3 25 net
Nail Pullers.—Little Giant—Small.....per doz., $22·00
Little Giant—Large....." 30·00
Padlocks.—Wilcox.....dis 40&5 %
All Brass, 2½ inch, 2 keys, job lot.....$9 00
Paper.—Tar'd Sheathing.....₩ ℔ 2 c
Dry Sheathing....." 3½c
" " "Beaver Brand" Rosin Sized..." 4½c
Tar'd " " " " " 3½c
Felt " " " " " 4½c
Virginia Cane Fibre.....4½c
Picks.—h. P. & Co., Solid Eyes.....5 to 6 6 to 7
$9 00 $9 50
Pins.—Universal Hat and Coat all wood—
2 in.....₩ gross $2 50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Potato Digger.—
" Partridge," 6 square tine.....₩ doz $12 00
Shumway & Co., 6 round tine.....₩ doz 9 00
Pulleys.—Axle.
Frame Pol. Wheel....No. 150, 50c., 1¼ in.; 16, 38c., 2 in.
Common Axle.....No. 18, 34c., 1¼ in.; 26, 40c., 2 in.
Milled Axle.....No. 2, 42c., 1¾ in.; 3, 50c., 2 in.
Nashua Pat. Axle Bronzed Face...1¾ in., 80c; 2 in., 90c
Cast Steel Axle.....2 in., $1·00
Pulley Blocks.—" Best Boston Make".....net
Common Strapped Blocks—
4 5 6 7 inch.
Single, 75c. 88c. $1·00 $1·13 each.
Double, $1·00 1·12 1·25 1·60 "
Inside Iron Strapped Blocks—
5 6 7 8 7 10 inch.
Single, $1·00 1·13 1·38 2·00 2·25 1·75 each.
Double, 1·88 2·30 2·63 3·63 4·00 5·00 "
Inside Iron Strapped Blocks, with Patent Roller Bushings—
5 6 7 8 9 10 inch.
Single, $1·25 1·50 1·63 2·50 2·65 3 50 each.
Double, 2·50 3·00 3·26 4·63 5·00 6·50 "
Plated Ware.—Rogers Bros.....dis 50 %
Plumb & Levels.—" Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels.....dis 50 %
No. 2, First Quality Levels.....dis 60&10 %
No. 3, Iron Pocket " .....dis 35 %
No. 4, Level and Plumb Glasses.....dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge.....dis 50&10 %
No. 6, Improved Iron Bench Planes.....dis 50&10 %
Pocket Knives.—Conn. Cutlery Co.....new net list
American Shear Co.....dis 33⅓ %
Rail Barn Door.—For Novelty and Anti-Friction Hangers.....per foot 7c., dis 30 %
Rivets.—Black.....dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8.
13 13 14 14 15 16c ₩ ℔ net
Rubber Moldings.—" Harmon's".....dis 10 %
No. 2, for Windows.....per foot, 5c
No. 3, for Doors.....per foot, 10c
No. 4, " .....per foot, 12c
Sad Irons.—Bliss & Drake.....₩ ℔ 4c
Sand Paper—0 to 2, $4·25; 2 to 3, $4·75.....dis 10 %
Saws.—*Hand and Panel*—
Wheeler, Madden & Clemson's, same list as " Diston's".....dis. 15 %
Diston's.....dis. 12½ %
Cross Cut—
Wheeler, Madden & Clemson X Cuts.....per ft., 37c
" " " "Star" X Cuts. " 60c
" " " Champion X Cut. " 60c
" " " One Man X Cut..each, $2·25
Boynton's genuine Lightning X Cut.....per ft., 60c
" " " One Man X Cut..each, $2·25
Circular—Wheeler, Madden & Clemson's.....dis. 25 %
Mill— " " " .....dis. 25 %
Screws.—Am. Screw Co., new list Sept. 1st....dis 30 %
Aiken's.....dis 30 %
Scythe Stones.—
" Willoughby Lake," first quality.....₩ gross $6·50
" second quality.....3·00
Shovels.—O. Ames.....dis 20 %
M. B. & O.....dis 20 %
Snow, Malleable Iron Tip, D Handle—Agents for New England.....$6·50
Snow, Malleable Iron Tip, long Handle—Agents for New England.....5·50
Sifters.—Coal, Ice, &c.....$12 00
Spading Forks.—M. & F.....dis 25 %
Stone Pickers.—" Partridge," original...₩ doz $15 00
Tools.—Aiken's Pattern, 20 in set; Parr's, $5·00 per doz
Traps.—Oneida.....dis 25 %
Blake's.....dis 50 %
Vises.—K. P. & Co.'s Solid Box. Blacksmith....₩ ℔ 13c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
" Howards." Parallel.....dis 20 %
Wardrobe Hooks.—Wire to drive.....₩ gross $1 00
Weather Strips.—" Harmon's".....per doz $5, dis 10 %
Weights.—Window Weights.....₩ ℔ 2c
Wedges—Axe.....₩ doz 35c
Wire.—
Eureka, in spools, No. 28 to 40 assorted...₩ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black.....₩ ft 5½c
Wrenches.—Genuine Wrenches, G. A. Coes..dis 40&5 %
Walton.....dis 50 %
Wringers.—
Novelty and Universal } Tub No. 2 } .....Less than doz, $12 00
.....2 doz or more, 10 00
Bench A....less than 2 doz $86 00; 2 doz or more $84 00
" B.... " " 94 00 " " 92 00
" C.... " " 110 00 " " 107 00
Eureka.....per doz $58 00
Withington, Cooley & Co.—
Hoes, Rakes, Forks, &c.....dis 33⅓ %

Boston Metal Market.

(*Corrected by Fuller, Dana & Fitz, 110 North Street, Boston, Importers and Commission Merchants.*)
September 1, 1875.

Iron.—Best Refined Bar Iron.....₩ ton $60 00
"Burden Best" " " 95 00
Swedish Bar Iron.....gold " 110 00
Norway Shapes.....gold " 125 00
Norway Nail Rods.....gold " 130 00
Sheet Iron, American.....₩ ℔ 4½c
" " Galvanized....." 9 c
" " Russian.....gold " 13½c
Plate Iron, C. No. 1.....₩ ℔ 3½c
Iron Rails.....₩ ton $50 00
Steel Rails....." 77 50
Pig Iron, Foundry, No. 1 extra....." 28 00
" " No. 2 extra....." 25 00
" Gray Forge....." 23 00
" Scotch....." 30 00 @ 32 00
" Wrought Scrap Iron....." 31 00
" Old Rails....." 28 00
Steel.—₩ ℔
Eng. Tool, gold 15½c
American Tool 14½c
" Mach 9½c
Bessemer 7 c
Tin Plates.—₩ box gold
I. C. Char. 10x14.....$8·10
I. C. Coke 10x14.....7·00
Char. Roof, IC, 14x20, 7 50
Coke " IC, 14x20, 6 50
METALS.
Pig Tin.—₩ ℔., gold
Banca 21c
Straits. 19c
English. 19c
German ₩ ℔ 9¾c
Spring. 8 c
Tire. 6 c
Sleigh Shoe. 4½c
Toe Calk. 7½c
Copper.—₩ ℔
Ingot. 23½c
Bolt. 30c
Sheathing. 30c
Lead.—₩ ℔
Pig. 7½c
Sheet & Pipe. 8·55
Zinc.—Sheet..₩ ℔ 10c
Spelter......₩ ℔ 7½c
Antimony......gold ₩ ℔ 12½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror.....₩ doz, $7 75
Hudson's Rotary....." 7 75
Axes.—Wm. Mann's, Red Warrior.....₩ doz $11 50
Wm. Mann's, W. Stewart's.....11 00
" C. Marshall.....10 50
" Handled.....$5 extra
" Double Bitted.....2, 5·50
H. L. B. & Co.'s, L. & Co.....11 50
" Pioneer.....12 00
" James & Co.....11 00
Hunt's.....12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles.....dis 10 & 5 %
Common Axles (Pat. Lubricating), 1⅛ inch and unward.....₩ ℔. 6½c.
do. less than 1⅛ inch.....7 c.
Bellows.—Sec. St. Louis make. 60c ₩ in. dis 20&2½ %
Bells.—Troy, Church, School and Farm Bells..₩ ℔ 44c
"Improved Amalgam Bronzed," 15 in., $3·00; 17 in., $4·00; 19 in., $6·00.....net
Belting.—"Boston Belting Co.'s Rubber..dis 30&7½ %
"Bradford & Sharp's" Oak-Tanned Leather....dis 5 %
Bolts.—Arms, Bell & Co.'s Carriage & Tire..dis 50&10 %
Arms, Bell & Co.'s Machine.....dis 33⅓10 %
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint.....dis 25&10 %
Broad Fast Joint.....dis 5 &10 %
" Loose " .....dis 45&10 %
Reversible.....dis 40&10 %
" Japanned and Silver Tipped.....dis 45&10 %
Loose Joint "Acorn" " " .....dis 45&10 %
Wheeling Hinge Co.'s W't Fast Joint Narrow.....dis 30 %
" " " Broad.....dis 35 %
" " Loose Joint.....dis 35 %
" " Reversible.....dis 35 %
" " Table & B'k Flaps.....30 %
Churns.—Julian, No. 2, $7·00; No. 3, $7·50; No. 4, $8·50.....dis 25 %
Cider Mills.—
American Senior, $40·00; Am. Junior, $25·00....dis 30 %
Corn Knives.—Dunn Edge Tool Co.'s Chip...₩ doz 5 00
Seymour Mfg. Co.'s solid Steel Back.....4 00
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers.....dis 10 %
Hand Shellers.....Special rates
Cotton Gins.—The Carver, 10 in. Saw, $4 a Saw..dis 15 %
12 in. Saw, $4·50 a Saw.....dis 10 %
Crow Bars.—Steel Pointed.....₩ ℔ 6½c
Drag Saw Machines.—
Culver's Iron Drag Saw.....dis 10 %
Robinson's Patent Sweepstakes Drag Saw....dis 10 %
Fanning Mills.—Nash & Cutt's.....dis 20 %
Feed Cutters.—Improved Burdick National...dis 30 %
Sanford No. 1, $10·75; No. 2, $8·00.....net
Files.—Black Diamond, Mill.....$5·00 £ currency.
" Bastard.....5·00 £ currency.
" Taper.....5·00 £ currency.
Forges.—Keystone Portable Forge Co.'s.....dis 12½ %
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks....dis 33⅓ %
" " Handled Hoes.....dis 33⅓ %

Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe.....dis 15 %
" Planet Drill, Nos. 2 and 3.....dis 15 %
" Combined Drill and Wheel Hoe.....dis 15 %
Grinding Mills.—Challenge Feed Mills.....dis 15 %
Sedgebeer's Nonpareil Mills.....dis 15 %
Hammers.—Masons' Hammers.....₩ ℔ 20c
Smiths' Hand.....20c
Handles.—No. 1 Fork, Hoe and Rake.....dis 20 %
No. 2 Fork, Hoe and Rake.....dis 40 %
Harrow Teeth.—1 inch iron.....₩ ℔ 4½c
⅞ and ¾ inch iron....." 4¾c
Barbed or Headed.....½c extra
Hay and Cotton Presses.—
Dederick's Railroad.....net list
" Perpetual.....net list
Hay Knives.—
Dunn Edge Tool Co.'s.....₩ doz $15 00—dis 15&5 %
Lightning (Weymouth's Patent).....₩ doz $30 50
Hinges.—
Wheeling Hinge Co.'s Strap & T.....dis 33⅓&10 %
Horse Hay Fork.—Nellis' Harpoon.....dis 45 %
Horse Nails.—National Patent Pointed.....2c rates
National Patent Pointed, extra finished.....3c "
Horse Powers.—Pitts or Carey's Patent.....dis 10 %
Wheeler's Railway.....dis 10 %
Sandwich Lever.....dis 10 %
Horse Rasps.—Heller Bros.....dis 45 %
" Black Diamond".....$6·00 to the £ currency
Horse Shoes.—
Rhode Island (Perkin's Pattern).....₩ keg, $5 50
" Mule....." 5 50
" Trotting Shoes....." 5 00
Tredegar Horse.....per keg $5 50
" Mule.....per keg 5·00
Hose.—
Boston Belting Co.'s Rubber Medium Sizes..dis 30&10 %
" " " " Small Sizes, Hydrant.....dis 40 %
Ice Tools.—W. T. Wood & Co.'s Saws.....new list net
W. T. Wood & Co.'s Chest Hatchets.....new list net
" " Axes.....new list net
" " Loading Tongs.....new list net
" " Medium, Small and Family Tongs.....new list net
" " Chisels, Hooks and Grapples.....new list ne
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks...₩ doz $13 00 @ 18 50
" " Grub Hoes, oval eye....." 10 00 @ 11 50
Money Drawers.—
Pierpont & Co.'s Excelsior.....per doz $40·00 net
Nails.—Wheeling.....$3 25 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 30 %
Boston Belting Co.'s Rubber, Pure.....dis 25&5 %
" " No. 2 Plain.....dis 40 %
" " Round and Square....dis 10&10 %
Picks.—Klein, Logan & Co.'s Railroad and Clay.....₩ doz $9 00 @ 11 00
Klein, Logan & Co.'s Coal....." 7 45 @ 8 40
" " Pole.....12 00 @ 13 50
" " stone.....14 40 @ 14 90
" " Tamping.....14 75 @ 15 85
" " Miners' Drifting.....10 25 @ 12 80
Plows.—Avery's Cast and Steel.....dis 20 %
Collins Cast Cast Steel.....new list net
Pekin Steel.....new list net
Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32.....dis 20 %
Pulleys.—5 inch.....per doz $4·25 net
4 inch.....per doz 3·25 net
Nellis' Patent.....new list dis 15 %
Pumps.—
St. Louis, Farm, Patent Metal Lined...new list dis 50 %
Rakes.—Paddock's Premium Sulky.....$8 00 net
St. Louis Revolving 14 tooth.....4 65 net
" " 16 " .....4 90 net
" Hand Hay Rake.....dis 20 %
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives.....dis 40 %
" " Sections.....dis 40 %
Road Scrapers.—Steel.....dis 40 %
Cast Iron.....dis 10&5 %
Sad Irons.—Monitor Brand, Silver Polished..₩ ℔ 4½c
Sash Weights.—Standard Solid Eyes.....₩ ℔ 4c
Saws.—Curtis & Co.....dis 10 %
Scythes.—Dunn Edge Tool Co.'s.....new list dis 20&5 %
Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7 00
Extra Indian Pond....." 9 50 } dis 25 %
Premium....." 10 50
Diamond Grit....." 13 00
Shovels and Spades.—Myers & Armor.....dis 15 %
O. Ames & Son.....dis 12½ %
Grain Scoops, Pat. Corrugated Straps M. & A.....dis 15 %
" " " T. Rowland's dis 15 %
" " " O. Ames & Son dis 12½&5 %
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.....₩ ℔ 15c
Solid Cast Steel....." 35c
Snaths and Cradles.—Seymour Mfg. Co.'s dis 20 %
Sorghum Machinery.—Beal Cane Mills.....dis 15 %
Scantlin's Seamless Evaporators.....dis 10 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 12½ %
Blue Seat Springs.....dis 15 %
Vises.—Solid Box.....₩ ℔ 16c
Wilson Mfg. Co.'s.....dis 15 %
Wheelbarrows.—Railroad & Garden.....new list net
Wrenches.—Coes' Genuine.....dis 25&5 %
Coes' Pattern.....dis 50&5 %
Wagons.—Whitewater Farm Wagons—
Thimble Skein.....No. 3, $76; 3½, $80 3½, $81
Iron Axle.....No. 1½, $80; 1⅝, $83 1⅝, $90

St. Louis Metal Market.

(*Corrected Weekly by Messrs. R. Sellew & Co.*)

Tin Plate.

IC, 10x14, Char.	10 00	IX, continuous, 20 in. x 200 ft.	
IX, 10x14, "	12 50	IC, 10x14, best Coke	$ 9
IC, 12x12, "	10 50	IX, 10x14, good Coke	9 00
IX, 12x12, "	13 00	IC, 14x20, Terne	9 50
IC, 14x20, "	11 00	IX, 14x20,	11 50
IX, 14x20, "	13 50	IC, 14x20,	9 50
IC, 14x20, Terne	9 50	IC, 14x20, Coke Lead,	
IX, 14x20, "	12 00	IC, 10x14, punch'd for Safes	9 00
IX, 20x28, "	24 00		
IC, continuous 20 in. x 200 ft.			

Block Tin.

Large Pigs	25c	Bars	27c
Small "	26c		

Sheet Zinc.

Casks	₩ ℔ 10½c	Sheet	₩ ℔ 11c

Solder.

No. 1, Refined, in bars or plate	17c
No. 2, " " "	14c
Pig Lead	7½c

Sheet Copper.—18 to 100 lbs. Sheets 30x60.....31c
14 to 16 lbs., Sheets 30x60.....31c
10 to 12 lbs., " " and 20x72.....32c
6 to 9 lbs., " " 35c
Tinned, 14 and 16 oz. 14x48.....32c
Planished, 14 and 16 oz. 14x48.....39c
" No. 7, 8 and 9.....41c
Copper Bottoms.....34c

Sheet Iron.

	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata
No. 24	4½c	5½c	6½c	8½c
25 & 26	4½c	5½c	7 c	9 c
27	4½c	5 c	7½c	9½c

Galvanized Iron.....dis 30 %

No. 16 to 20	12c	No. 22	13c
21 to 24	13c	28	16c
25 & 26	14c		

Russia Iron.—No. 1 Stained.....16c
Perfect.....17c In sheets, 1c. higher.
American Russia.—B.....11c
A.....14c In sheets, 1c higher.
Lead.—Lead Pipe, in full coils 8½c
Pig.....7½c Lead Pipe, when cut. 8½c
Bar.....8½c Sheet Lead.....9½c
Wire—Bright.....dis 35 %
Copperas.....dis 30 %

CHICAGO.

(*Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.*)
September 10, 1875.

Tin Plate.—

10x14, IC, Ch'l. Good.s		14x20, IX, Ch'l Best.	$13 00
10x14, IC, " Best.	9 50	14x20, IXX, " "	15 50
10x14, IX, " "	11 00	14x20, IXXX, " "	18 00
12x12, IC, " "	10 00	DC, 100 Plate, " "	9 00
12x12, IX, " "	12 50	DX, " "	14 00
14x20, IC, " "	10 00	DXX, " "	14 50
Roofing IC, Charcoal, Best		DXXX, " "	17 00
Roofing IX, Charcoal "			9 00
20x28, IC, Charcoal Roofing, Com			11 50
20x28, IC, " Good			13 00
20x28, IC, " Best			15 50
20x28, IX, " "			19 00
10x14, IC, Coke Plates			23 50
14x20, IC, "			8 50 to 9 75
10x20, IC, "			9 00 to 9 50
			14 00

Block Tin.—

Large Pigs	25c	Bars	27c
Small "	26c		

Zinc.—Sheet, 500 to 1000 lb. Casks.....10½c
Loose Sheets.....11c
Slab Zinc or Spelter.....7½c
Copper.—Bottoms.....34c
Sheathing.....32c
Planished.....36c
" Boiler lengths.....41c
Ingot.....—
Bolt.....35c
Bruzlers' Sheets.—30x60, 6 & 7 lbs....₩ ℔ 36c | 30x60, 10 & 12 lbs...₩ ℔ 35c
3.x60, 8 & 9 lbs. " 35c | 30x60, 15 to 100 lbs. " 34c
Solder.—F. S. & Co.'s make.
Best Fine.....30c
No. 1.....19c
Roofing.....17c
Brazlers' or Spelter Solder.....35c
Antimony.....18c
Babbit Metal—F. S. & Co.'s.....16c
No. 2.....14c
Sheet Iron.—

	Smooth. Com.	Smooth Charcoal.	Smooth Juniata
No. 24	5½c	6½c	8½c
25 & 26	5½c	7 c	9 c
27	6 c	7½c	9½c

Galvanized Iron.....dis 30 %

No. 16 to 20	12c	No. 22	13c
21 to 24	13c	28	16c
25 & 26	14c		

Russia Iron.—No. 1 Stained.....16c
Perfect.....17c In sheets, 1c. higher.
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Lead.—Lead Pipe, in full coils 8½c
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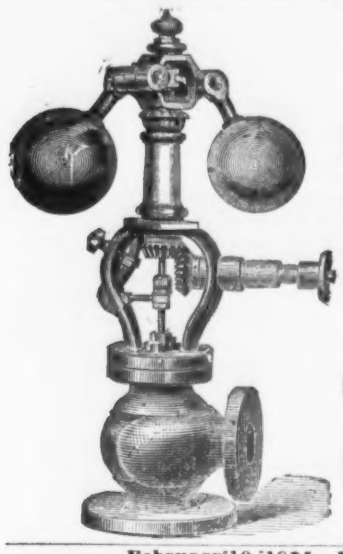
Sheet Lead.....9½c
Wire—Bright.....dis 35 %
Copperas.....dis 30 %



TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

Shive Governor Co

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR,

AND

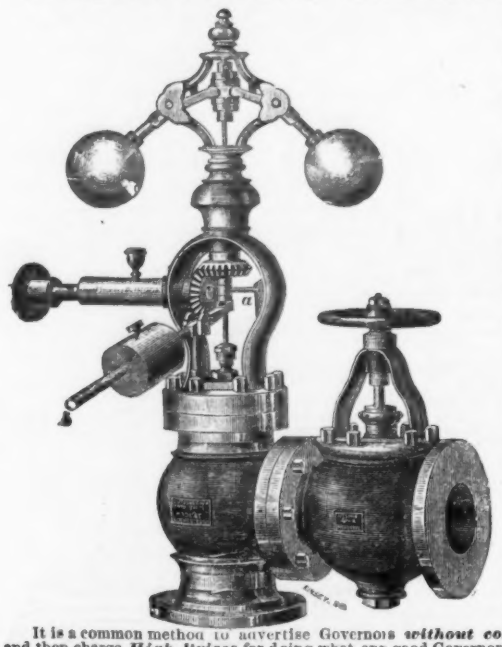
Buoy's Patent Counter Scale.

No Nest of Weights.

Circulars sent free

February 10, 1875. REDUCED PRICE LIST OF THE

JUDSON PATENT IMPROVED GOVERNORS.



☞ When Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Black, Finished or Portable, as you may require, and with or without Lever Attachment.

For dimensions and other particulars send for Illustrated List.

Capacity of Valve or Diameter of Steam Pipe in inches.	Price, Black.	Price, Bright Finish.	Price, Portable.	Price of Lever Attachment for altering speed.	Price of Stop Valve.
¾	18·00	20·00	17·00	..	..
⅞	20·00	22·00	19·00	..	..
1	24·00	27·00	22·00	2·00	5·25
1¼	29·00	32·00	27·00	2·25	6·64
1½	34·00	38·00	31·00	2·50	8·50
2	41·00	46·00	38·00	2·75	11·50
2¼	47·00	54·00	..	3·25	16·00
2½	50·00	57·00	47·00	3·50	17·00
2¾	55·00	62·00		3·75	19·00
3	62·00	70·00		4·25	22·00
3¼	71·00	80·00		4·50	27·00
4	81·00	92·00		5·00	32·00
4¼	91·00	103·00	No Larger Portable made than 2½ in.	5·50	37·00
5	102·00	114·00		6·00	42·00
5¼	116·00	129·00		6·50	48·00
6	134·00	148·00		7·00	55·00
7	160·00	176·00		8·00	69·00
8	199·00	219·00		9·00	83·00
9	230·00	255·00		10·00	..

No Charge for Boxing & Carriage.

It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

JUNIUS JUDSON & SON, Rochester, N. Y.

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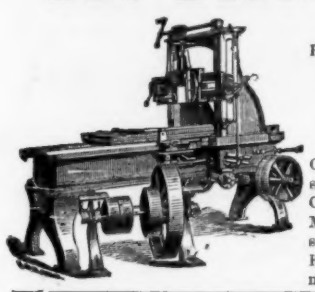
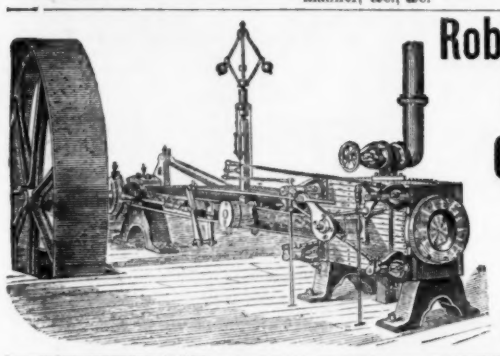
Hartford, Conn.,



Have constantly on hand and making

Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



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CHESTER, PA.

Corliss Engine BUILDERS

AND

Boiler Makers.

THORNE, DeHAVEN & CO.

21st Street, above Market,

PHILADELPHIA.

DRILLING MACHINES.

PORTABLE DRILLS. Driven by power in any direction, self-feed and convenient adjustment.

RADIAL DRILLS. Self-feed—large adjustable box table—separate base plate, every convenience.

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SPECIAL DRILLS. For special work. Gun Blank Drills, Coal Drills, &c., built to order.

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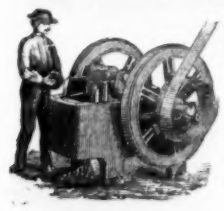
STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

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Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

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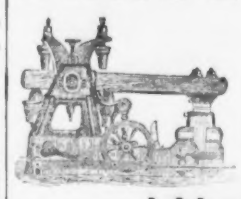

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Is More Durable, takes up Less Room, does More and Better Work with less expense for Power and Repairs than any other Hammer in use.

GUARANTEED as RECOMMENDED.

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Manufacturers of the Celebrated

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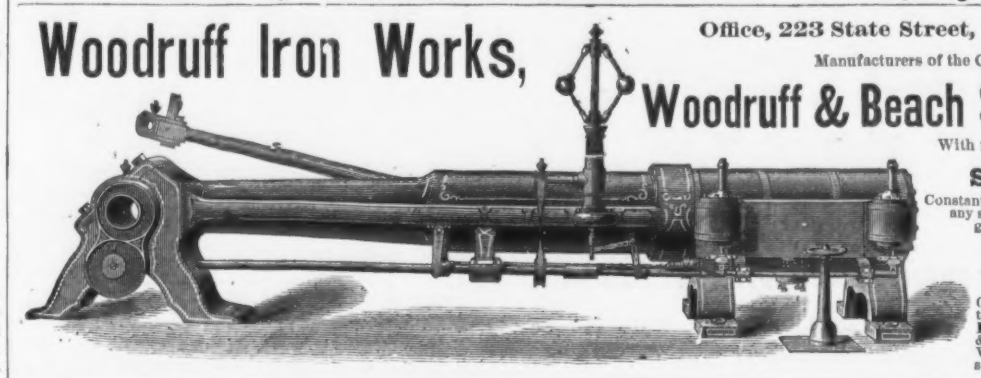
With recent valuable improvements.



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CASTINGS

Of any size or style. Direct all letters to **The Woodruff Iron Works, Hartford, Conn.**, as the Woodruff & Beach Iron Works and firm of Woodruff & Beach are both dissolved.

Knowles Patent Steam Pumps

MANUFACTURED BY THE

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14 & 16 Federal Street, Boston, 92 & 94 Liberty Street, N. Y.

Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

FIRE PUMPS, a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best.

Every machine furnished under a complete guarantee.

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Sole Manufacturers of

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Machinery Metalined, or Metaline furnished to Machine Builders.

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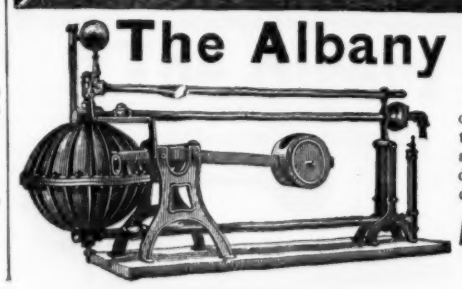

This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

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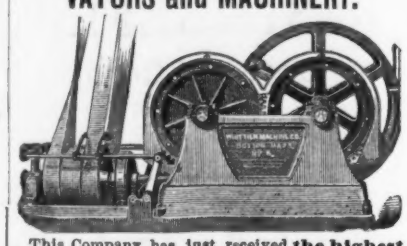

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Successors to the

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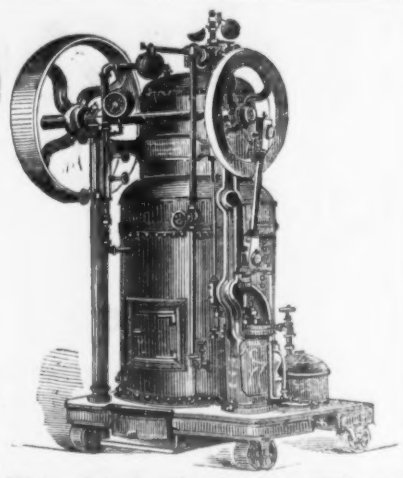

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Cheaper than any Engine offered of the same capacity.

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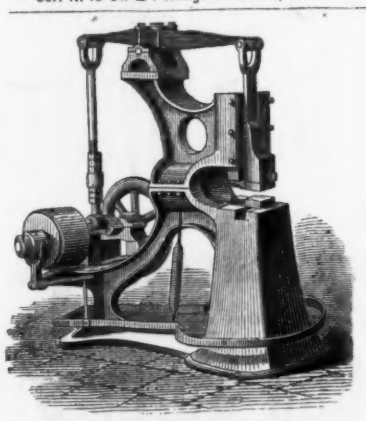
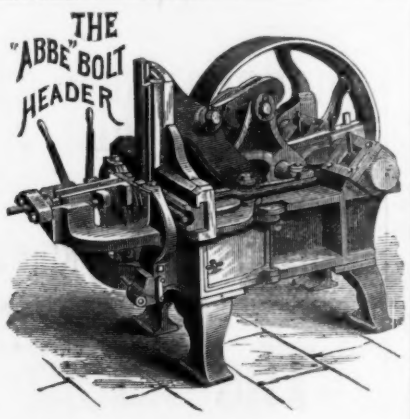


THE PALMER POWER SPRING HAMMER.



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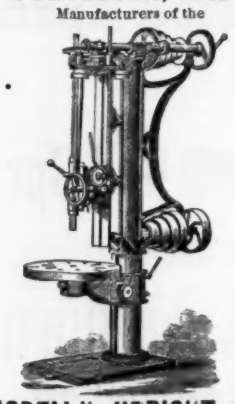
Manufacturers of the



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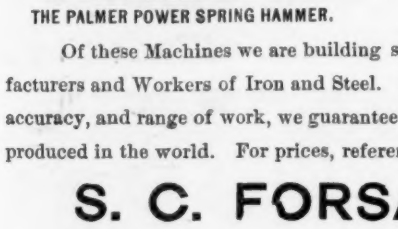

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A pure Lubricator, free from water, gum or sediment. The best article made for *Wagons, Open Journals, Cog Wheels Rollers* and wherever a *Solid Lubricator* or *Grease* can be applied. Put up in Boxes, Kegs and Barrels. For prices see New York Price List in this paper.
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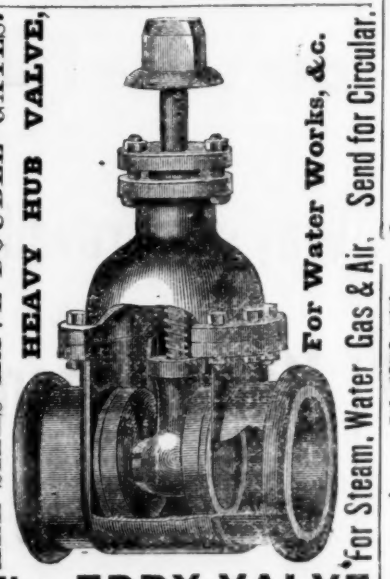

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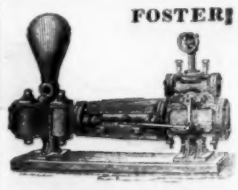

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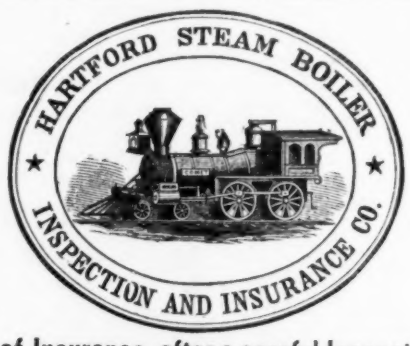

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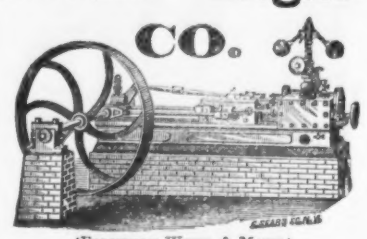

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STEAM ENGINES

The best and Most Complete Assortment in the Market.

These Engines have always maintained the very highest standard of excellence. We make the manufacture of Engines, Boilers and Saw Mills a specialty. We have the largest and most complete works in the country with machinery specially adapted to the work.

We keep constantly in process large numbers of Engines, which we furnish at the very lowest prices and on the shortest notice. We build Engines specially adapted to Mines, Saw Mills, Grist Mills, Tanneries, Cotton Gins, Threshers and all classes of manufacturing.

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We make the manufacture of Saw Mill Outfits a special feature of our business, and can furnish complete on the shortest notice.

Our aim in all cases is to furnish the best machine in the market, and work absolutely unequalled for design, economy and strength.

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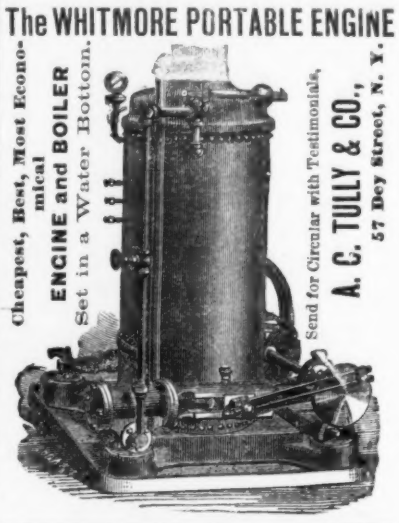

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and other

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For Sale by

New Haven Mfg. Co.,

NEW HAVEN, CONN.

MINERS' CANDLES.

Superior to any other Light for Mining Purposes. Manufactured by

JAMES BOYD'S SONS,
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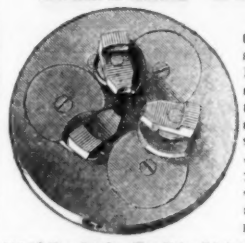
JOHNSON'S PATENT UNIVERSAL LATHE CHUCK.



We invite attention to the superior construction of this chuck. Its working parts are **absolutely protected from dirt and chips.** It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address,

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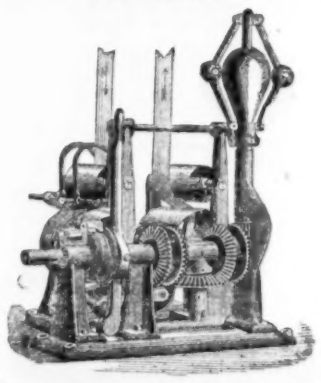
DIFFERENTIAL GOVERNOR.

The HARTFORD GOVERNOR CO.,
Sole makers of the
Weaver Differential Governor
FOR WATER.



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TUBAL SMELTING WORKS,

760 South Broad Street, PHILADELPHIA.

PAUL S. REEVES,

MANUFACTURER OF

ANTI-FRICTION METALS.

XXX Genuine	40c	C	20c
XX	38c	D	15c
X	35c	E	13c
A	30c	F	11c
B	25c		

"Note."—The above are my standard mixtures, and have given satisfaction wherever used, but I am prepared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

BRASS CASTINGS, 21 to 35c. | **INGOT BRASS,** 19 to 28c. | **BRASS TURNINGS AND OLD METALS WANTED.**

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TIRE, SLEIGH SHOE,

Machine and Blank Bolts.

FERNALD & SISE, N. Y. Agents, 100 Chambers St.

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P. O. Address: Frankford, Philad'a. | MANUFACTURERS OF ALL KINDS OF

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Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.
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BESSEMER TOE, SLEIGH AND TIRE STEEL.
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NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.

NEW TIME TABLE.

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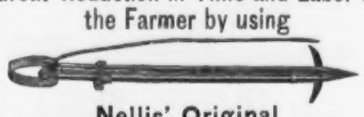

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HARPOON HORSE HAY FORK,

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Grapple and Pulleys; also, Nellis' Patent Stacker and Method of conveying Hay, Straw, &c. A ton of Hay can be delivered in three to five minutes to any part of Mow or Stack. The right of Stacker and Conveyer granted FREE to the Farmer purchasing our Horse Hay Fork and Fixtures during season of 1875. With it Pulleys can be attached or detached to rafter or beam, without the use of a ladder.

NELLIS' PULLEY,

Improved Wrought Frame, Prepared Wood Wheel. Warranted superior to any Horse Fork Pulley offered in the market.

A trial of these goods will convince any farmer that he cannot afford to dispense with them, as their entire cost is often times saved by a single day's use.

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Of Agricultural Steel & Iron,

Steel Tempered by Nellis' process to suit every kind of soil.

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Manufacturer of the

Each mouse caught resets the Trap for another.

TUBULAR

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BRASS AND IRON

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STANLEY G. FLAGG & CO.

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A Substitute for Steel and Wrought Forgings.

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Security, Durability, Convenience.

IMPROVED SELF-LOCKING

Brass Pad Locks.

Made in the most substantial and compact manner, and are in every respect a superior article. We guarantee that no two locks are alike, unless specially ordered. Each lock furnished with two keys. Any number of locks or keys made to order. Adopted by the United States Government. Samples of No. 1 Lock sent to all parts free, on receipt of $1.75. **Liberal Discounts to the Trade.**

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Lamps, Bronzes,

Equal to any made, in great variety, all of our own manufacture.

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Brass Works,

J. M. EVERHART,

Manufacturer of **Brass Work for Water, Gas and Steam.** Brass Castings and Jobbing promptly attended

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STOVE POLISH.

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Carriage, Tire, Plow, Stove

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Carriage Bolts made from Best Square Iron, a Specialty.

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All the Leading kinds at lowest cash prices.

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To be of Best Quality of Cast Steel Wire, and Excellent Temper.

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Old Style  Rod Springs,

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Are warranted to be FIRST-CLASS in every respect.

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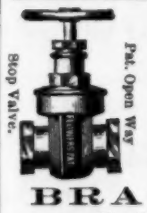

Schofield's Pat. Gauge Cock.

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BRASS WORK

For Water, Gas and Steam.

Importers and Dealers in **PLUMBERS' MATERIALS,**

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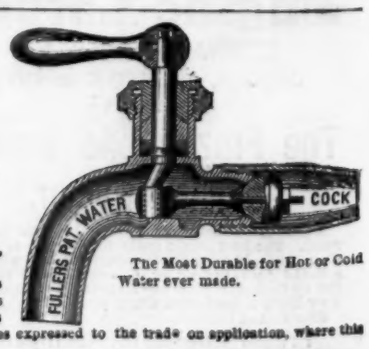

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